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NURSING HOME BED UTILIZATION IN ALBERTA: A PATIENT ORIGIN-DESTINATION STUDY

by

© S. MARLENE RAASOK

A THESIS

SUBMITTED TO THE FACULTY OF GRADUATE STUDIES AND RESEARCH

IN PARTIAL FULFILMENT OF THE REQUIREMENTS FOR THE DEGREE

OF MASTER OF HEALTH SERVICES ADMINISTRATION

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THE UNIVERSITY OF ALBERTA

FACULTY OF GRADUATE STUDIES AND RESEARCH

The undersigned certify that they have read, and recommend to the Faculty of Graduate Studies and Research, for acceptance, a thesis entitled Nursing Home Bed Utilization in Alberta: A Patient Origin-Destination Study submitted by S. Marlene Raasok in partial fulfilment of the requirements for the degree of Master of Health Services Administration.

.....
Supervisor

.....

.....

Date.....October 3., 1979

To my parents

whose years of care for my grandfather

stimulated my interest in health

care services for the elderly.

ABSTRACT

Following from the Medicus Canada Report (1978) which provided preliminary evidence that nursing home beds were not distributed equitably throughout the province of Alberta, this study was undertaken to answer several broad questions concerning regional variations in utilization patterns and their relationships to the distribution of nursing home beds.

Patient origin-destination techniques, using administrative data obtained from the admission records of all Alberta residents in nursing homes as of December 31, 1976, formed the methodological basis for this thesis. By considering where the patient came from and where the patient went to receive care, it was possible to examine the following geographic aspects of nursing home utilization: 1) patient origin-to-nursing home flow patterns; 2) regional variations in per capita bed supply and utilization; 3) relationships between nursing home area and facility characteristics and resulting patient flow patterns; and 4) variations in patient characteristics between areas of high versus low rates of nursing home utilization.

Major findings may be summarized as follows:

1) Nursing home utilization appears to be primarily a local phenomenon (i.e., patients generally obtain care in their areas of origin), with the availability of nursing home beds being a major factor influencing patient origin-to-nursing home flow patterns.
2) Characteristics of nursing homes (e.g., ownership, size, and accreditation status) appear to influence, albeit weakly, patient origin-destination patterns.

3) Variations exist across the province in both per capita bed supply and rates of institutionalization, with most areas having high bed supply also experiencing higher rates of institutionalization.

4) Compared to patients from high-use areas, nursing home patients from low-use areas are older and more likely to be admitted from general hospitals and extended care institutions and less likely to be admitted from private homes.

5) Compared to patients in rural areas, nursing home patients in the large urban centres of Edmonton and Calgary are more likely to be female, nonmarried, and admitted to nursing homes from private homes.

Based on these findings, it appears 1) that nursing home bed supply does influence utilization patterns, 2) that patterns of utilization may differ between urban and rural settings, and 3) that nursing homes should be seen as having different attributes which may influence patients' care-seeking behaviors. Taken together, these statements culminate in the central conclusion of this thesis: Planners must think more broadly than merely counting the number of beds in a specific geographic area; in making decisions regarding supply and distribution of nursing home beds, they must also consider the specific characteristics of nursing homes in an area, the nature of persons being served, and the flow of patients through the overall health care system.

Recommendations leading from these findings and conclusions and relating to nursing home planning, policy formulation and research are offered. Also provided is a research proposal for a patient survey which would be suitable for verifying and extending the findings from the present study.

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Sincere appreciation is expressed to Dr. Kyung Bay for his guidance and encouragement from initiation to completion of this study. His emphasis on high standards in research, plus his interest in improving methods of health planning and provision of health services for the elderly have been constant sources of stimulation in my work.

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CHAPTER I

INTRODUCTION

In the foreseeable future, need for long-term care may be expected to increase both qualitatively and quantitatively, a result of the changing nature of morbidity (i.e., the relative increase in the prevalence of chronic disease) and the projected growth of the geriatric population. This study's focus on selected aspects of nursing home utilization and their implications for health care planning reflects the importance of nursing homes as one aspect of the institutional system of long-term health care.

1.1 Statement and Importance of the Problem

Concern has recently been expressed regarding the availability and accessibility of nursing home facilities throughout the province of Alberta; specifically, preliminary evidence indicates that the distribution of nursing home beds is not proportionally related to the distribution of either the general population or the elderly population (Medicus Canada, 1978).

In this investigator's opinion, three factors are involved in the above problem. First, regional variations in per capita bed distribution depend on the geographic divisions used in the analysis. Second, population shifts have tended to create a problem in the localization of age cohorts, with small urban and rural areas having somewhat older populations than the major urban centres. Third, urbanization has tended to produce a concentration of services and facilities in the large urban areas. The fact remains, however, that all residents of

the province should have similar access to nursing home care under current public accountability for nursing home services; hence, further investigation of this problem and its impact on utilization patterns was considered of prime importance. In that regard, this study was undertaken to answer several broad, basic questions concerning utilization patterns and their relationships to the distribution of nursing home beds.

1.2 Significance of the Study

The foregoing problem regarding nursing home bed distribution underscores one of the practical difficulties encountered in health planning, namely that of estimating, or establishing guidelines for, resource requirements which will reflect realistically the needs of particular population groups. Public policy objectives in the provision of nursing home care - quality, availability, accessibility, and cost containment - are promoted by different groups with conflicting but legitimate interests. The task faced by health planners and policy makers is to balance health care, economic, and political consequences of decisions related to these objectives as they affect patients, providers, and the public (the taxpayers). Notwithstanding the superior value of data regarding actual need (as opposed to demand) for nursing home care as a basis for making these planning decisions, it is this investigator's opinion that if comprehensive patterns of demand for (or utilization of) nursing home care can be identified, planners may make resource recommendations with justifiably greater conviction.

In view of both the above comments and the expressed concerns regarding the present distribution of nursing home beds, the significance of this analysis of nursing home utilization becomes evident: First,

information regarding patient origin-to-nursing home flow patterns provides a basis for identifying geographic parameters which may influence utilization. Second, information regarding regional variations in rates of institutionalization or patterns of utilization may identify areas requiring further study and clarification. Finally, information regarding regional variations in utilization patterns and their relationships to nursing home bed availability may be useful in reviewing applications to build nursing homes in Alberta.

Further to the above, it appears that although the literature related to nursing home utilization is voluminous, little information is available regarding geographic perspectives in utilization (this is especially true concerning the relationship of patients' care-seeking behaviors to availability of nursing home beds or regional variations in utilization patterns). In addition, patient origin-destination studies have seldom been used in analyses of nursing home utilization, although their utility in studies of hospital utilization is well-documented.

In view of the foregoing observations, this study was designed to provide information relevant not only to nursing home planning and policy formulation but also to a better understanding of patients' care seeking behaviors as evidenced by patient origin-to-nursing home flow patterns and related regional analyses of utilization patterns.

1.3 Objectives and Research Approach

In response to the problem of inequitable nursing home bed supply and its possible impact on utilization patterns, the following primary objectives were identified for this analysis of geographic perspectives in nursing home utilization:

1) to examine the movement of patients as they seek nursing home care by analyzing patient origin-to-nursing home flow patterns;
2) to determine whether relationships exist between patient origin-destination flow patterns and such factors as the location and bed supply of the area of patient origin or the location and size of the nursing home; and
3) to determine whether regional variations exist in rates of institutionalization and whether patterns of utilization (as indicated by selected patient characteristics) vary between areas of low versus high rates of nursing home institutionalization.

With respect to these primary objectives, consideration of utilization patterns in sufficient detail to determine their relationships to patients' needs for nursing home care or reasons for choosing a particular facility was beyond the scope of this study. Because of this, a secondary objective of this study was to prepare a research proposal for a patient survey which would be suitable for extending this analysis of nursing home utilization by focusing on the decision-making process leading up to nursing home admission.

Throughout the study, emphasis was placed on providing information which would be useful in both short-term and long-range planning of nursing home facilities for the people of this province. In addition, although it was recognized that the need for long-term institutional care occurs with people other than the elderly, the focus here was primarily on the geriatric population since members of this group are the predominant recipients of nursing home care.

1.4 Assumptions and Limitations

In developing the objectives and methodology for this study, three assumptions were made:

1) It was assumed that the government's intent is to gain a proper mix of health care facilities throughout the province and, specifically, to balance nursing home facilities to meet urban and rural long-term care needs (though not to overlook possible economies of regional services).

2) It is known that a certain number of people require nursing home care. In that regard, it was assumed that current rates of nursing home utilization (aggregated at the provincial level) approximate long-term care need. This assumption was admittedly idealistic; however, it was a necessary one because of the lack of data regarding either overuse or underuse of nursing home care (definitions of these parameters are matters to be decided by governing authorities reflecting societal value judgements and assisted by professionals' expertise).

3) The study area (the province of Alberta) can be divided into mutually exclusive and exhaustive geographic areas called "hospital districts". It was then assumed that these districts could be grouped into a smaller number of nursing home areas. This assumption was necessary in order to carry out the patient origin study and to permit an analysis of regional variations in bed supply, rates of institutionalization and patterns of utilization.

The limitations imposed on this research were due mainly to limitations in the data and technical necessities. The major

limitations are as follows:

1) In determining origins for the nursing home patients, the home addresses in the computerized data file used for this study may not have provided a patient's true origin. Since this address indicates a patient's location immediately prior to entering a nursing home, this may have been the home of family or friends which served as an address of convenience while awaiting a nursing home bed rather than the patient's original address. Personal interviews with patients would have been required to determine patients' true origins; however, collection of this information was beyond the scope of this thesis because of the time and cost involved. The investigator believes, though, that the influence of possible misrepresentations of patient origins on study results is likely to be minimal given the consistently strong evidence supporting study findings and conclusions.

2) One limitation in using hospital districts as areas of patient origin was that they vary greatly in size and shape, hence distances travelled by patients to nursing homes may vary significantly even though patients remain in their districts of residence to receive care. To circumvent this problem and allow a measure of distance to be made, it would have been necessary to express patient origin as a point location. However, incorporation of this detail in a province-wide study of patient origin-destination patterns was not feasible since it would have created prohibitive data-management problems.

3) The study was limited to an analysis of present utilization patterns. Although patient origin-destination information ideally

would indicate trends over time, this study was limited to one cross-sectional study because of the available data.

4) Analyses were limited to descriptive statistics and questions of relationship or comparison which provided only a weak basis for causal inferences. No conclusion is provided regarding why patients seek nursing home care in the places where they do (this question goes beyond the data available for this study and would have required a special survey of patients in order to be answered). This investigator feels this is not a serious limitation in that such detailed information concerning patients' care-seeking behaviors is not regularly available; rather, planners must rely on administrative data regarding utilization (the focus of this study) as the basis for planning decisions.

5) Analysis of nursing home utilization patterns was limited to providing information relating primarily to patients' care-seeking behaviors. Per capita bed supply or utilization data cannot be used for determining adequacy of bed supply or level of need for nursing home care; these results are a function of the geographic areas used, and no judgement is made regarding the appropriateness of utilization.

1.5 Definition of Terms

The following definitions are adopted for this study:

"Destination" refers to the nursing home where a patient was admitted for care.

The "elderly" (or the geriatric population) refers to those persons age 65 or older, in keeping with social and legislative practices.

"Institutionalization" is used here to denote placement or

residence for care in a nursing home.

"Long-term care" is interpreted as "one or more services provided on a sustained basis to enable individuals whose functional capabilities are chronically impaired to be maintained at the maximum levels of health and well being" (Brody, 1977, p. 14).

"Nursing home" refers to all those facilities licensed by government to provide personal care with nursing supervision.

"Patient origin" refers to the geographic area from which a patient came prior to admission to the nursing home.

"Rural", as it is used here, refers to nonurban areas in the province.

"Urban" centres refer to cities with populations of 30,000 or more and are classed as small or large: "small urban" centres refer to cities with populations of 30,000 to 400,000, thereby including Red Deer, Lethbridge, and Medicine Hat; "large urban" centres refer to cities with populations greater than 400,000, hence including only Edmonton and Calgary.

1.6 Format of the Thesis

This thesis is divided into six main chapters and two appendices. Chapter II contains a review of literature pertinent to an analysis of nursing home utilization through a patient origin-destination study. Chapter III describes the methodology of the study. Chapter IV presents the results of data analysis and their implications for nursing home planning and is followed by Chapter V which outlines a research proposal for a patient survey designed to complement and extend the findings from the present study. The concluding chapter (Chapter VI) provides a summary of the study plus conclusions and recommendations arising from the project. Appendix A contains supplementary information related to the methodology, and Appendix B presents selected study findings in greater detail than provided in the main text.

CHAPTER II

A SELECTIVE REVIEW OF THE LITERATURE

In this chapter, the investigator reviews the major literature related to the objectives of the study. The review focuses on four key areas: 1) a conceptual model of nursing home utilization, presented as the framework for analysis; 2) aspects of nursing home utilization having specific relevance to this study; 3) aspects of patient origin-destination studies pertinent to the methodology; and 4) relevant prior research in Alberta, provided as a background for the work being undertaken in this thesis.

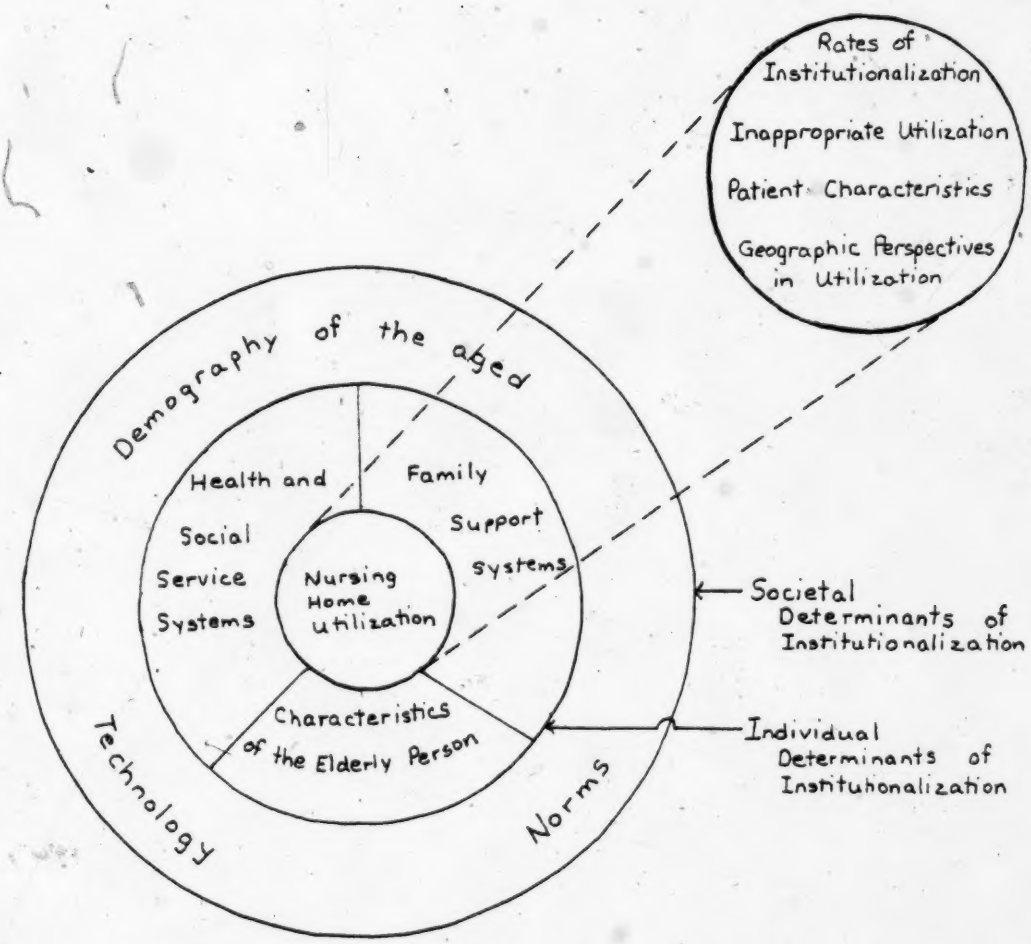
2.1 Conceptual Model of Nursing Home Utilization

Although the present study is concerned with very specific aspects of nursing home utilization (i.e., patient origin-to-nursing home flow patterns, rates of institutionalization, and selected patient characteristics), it is important to consider these areas in context with those factors which influence the nature, extent, and process of nursing home admission. This not only places the study into perspective in relation to the total subject of nursing home utilization, but also provides a basis for interpretation of study findings.

The conceptual model depicted in Figure 1 illustrates the interrelationships between societal and individual determinants of institutionalization and those aspects of nursing home utilization which have specific relevance to this study. This model draws on concepts suggested by Anderson and Newman (1973) in their study of medical care utilization and by Ward (1977) in his review of factors which influence health care utilization by the elderly. Regarding the model's

Figure 1

A Conceptual Model of Nursing Home Utilization



elements, societal determinants refer to those factors which exert overall influences on the environment in which nursing home utilization takes place. Examples of such factors include increases in numbers of elderly in the population, changes in patterns of disease or aging due to advances in medical technology, and changes in formal legislation or society's expectations with respect to nursing home care. Within this "environment", factors specific to individual persons ultimately determine admission to nursing homes. The underlying model assumes that a sequence of events influences a person's need for, choice of, and access to nursing home care; specifically, institutionalization is dependent on characteristics of the elderly person, family support systems, and health and social service systems.

Although a comprehensive review of the literature related to the above societal and individual determinants of institutionalization is beyond the scope of this thesis, a brief discussion of these factors follows in order to provide a more complete basis for subsequent examinations of specific aspects of nursing home utilization.

2.1.1 Societal Determinants of Institutionalization

The societal, or "environmental", factors influencing nursing home utilization are considered in two sub-sections, the first describing demographic factors of the elderly and the second describing factors related to technology and societal norms.

Demography of the aged. The most salient aspect of the structural changes in Canadian population growth as projected to 2001 is the historically unprecedented increase in both the number and proportion of persons age 65 or older (Rombout, 1975). According to the Science

Council of Canada (1976), this change results from a progressive - although erratic - long term decline in fertility, combined with a gradual reduction in deaths at earlier ages (hence, more people survive to elderly status). It is forecasted that the actual number of elderly people in Canada will increase by 70 percent in the last quarter of this century: from 2.0 million (8.7 percent of the total population) in 1976 to 3.4 million (10.9 percent of the population) in 2001 (Projection B, Statistics Canada, 1974). Projections for Alberta indicate that the number of elderly will almost double over this same time period: from 138,000 in 1976 to 266,100 in 2001 (Projection B, Statistics Canada, 1974), although the proportion of elderly in the total population is not expected to increase as dramatically due to the large influx of younger persons into the province.

One factor in this aging phenomenon deserves specific attention: not only is the total stratum of people over age 65 increasing, but the proportions within it of the "very" elderly are increasing as well. For example, statistics for Alberta indicate that in 1976, of the geriatric population, 62.0 percent were age 65-74, 28.9 percent were age 75-84, and 9.1 percent were age 85 or older (Statistics Canada, 1976). In contrast, by 2001, it is estimated that of the geriatric population, 57.1 percent will be age 65-74, whereas 32.4 percent will be age 75-84 and 10.5 percent will be age 85 or older (Projection B, Statistics Canada, 1972). The projected increase in the over age 75 (and especially the over 85) group is tremendously important in terms of future nursing home needs because the prevalence of chronic disease and impairment increases sharply with age - the inflection point (i.e., the point of sharp increase) appears to be around age

75 (Kovar, 1977).

The demographic indicator of sex ratio, usually expressed as the number of males per 100 females (Cutler & Harootyan, 1975, p. 48), provides additional information regarding the potential impact of aging on utilization of nursing home care. Higher mortality rates among males at every age have operated to reduce the excess of males found at birth and among Canada's early immigrants (Kalbach & McVey, 1971, p. 114). The result is that elderly females consistently outnumber elderly males, and this differential is widening (Clark & Collishaw, 1975). In Canada, life expectancy at birth for women is 75.2 years and for men, 68.8 years (United Nations, 1972). Because of this, the geriatric boom is likely to present an even greater degree of widowhood and "single" elderly women with attendant social, economic, and housing problems.

With respect to the residential distribution of the elderly in Canada, Schwenger (1975) notes that there is a "continuous depopulation of our rural areas, leaving a residual, relatively high percentage of aged, especially in small towns and villages" (p. 24). These shifts have obvious implications for the distribution of nursing homes - the problem being studied.

One last demographic characteristic, marital status, deserves mention. It appears that a large proportion of the elderly are single, widowed, or divorced. Most of them are female, as indicated by these statistics for Alberta: 73.1 percent of males over 65 are married compared to 41.6 percent of females, and half of the females over 65 are widowed compared to only 14.1 percent of the males (Englemann, Howell, & Harper, 1977). Marital status is an important indicator of

social support; those individuals who are single, widowed, or divorced are less likely to have someone to rely on in everyday living and may, therefore, be more likely to require auxiliary health and social supports such as nursing home care.

In relation to these demographic aspects of aging, Wigdor (1978) makes an important observation (an observation not fully appreciated in previous literature): It is important to understand cohort differences not only in terms of changes in health, but also in relation to welfare and lifestyle. Factors such as nutrition, general health, education, and stress which influence how well people age may create a healthier, more active, more alert, and better informed group of people who are going to comprise the "young-old" (65-74) group at the turn of the century. Policies and planning must take into account these cohort differences (Wigdor, 1978).

The cogent remarks by Wigdor, plus the observed importance of age in relation to both the number and the dependency status of elderly persons, emphasize the need to consider demographic factors when interpreting nursing home utilization patterns or planning future nursing home services.

Technology and norms. Regarding the influence of technology on nursing home utilization, the growing number of elderly in the population is partly a result of the decline in deaths at earlier ages due to tuberculosis, influenza, pneumonia, and other infectious diseases. This decline has generally been attributed to new technologies such as sanitation measures, immunization, and antibiotics (Andersen & Newman, 1973).

The impact of societal norms has been equally obvious in terms

of the effects of formal legislation and social values on provision and utilization of nursing homes and other long-term care facilities. In Alberta, the beginning of the Senior Citizens' Home Program in 1959 and the passing of the Auxiliary Hospitals Act in 1960 and the Nursing Home Act in 1964 resulted in a substantial increase in the number of these facilities, thereby allowing greater access to the institutional system for long-term care. It has also been suggested that the recently expanded Provincial Home Care Program will permit elderly persons to remain in their homes for longer periods, thus possibly influencing rates of institutionalization or resulting in increased ages and disability levels of persons entering nursing homes (Medicus Canada, 1978). Finally, changes in the treatment of mental illness with transfer of patients from mental hospitals into the community and nursing homes (as described by Alberta Hospital Services Commission, 1974) is an example of the joint impact of technology and norms.

From the above, it is obvious that societal determinants (technology, norms, and demographic factors) may have pervasive - although indirect - influences on the extent and nature of nursing home utilization. Individual determinants, which have direct influences on nursing home admission, are considered in the following section.

2.1.2 Individual Determinants of Institutionalization

As mentioned previously, three groups of variables are considered important in determining an individual person's likelihood of nursing home admission, namely, characteristics of the elderly person, family support systems, and the health and social service system.

Characteristics of the elderly person. The health and social

status of the elderly person is a key determinant of institutionalization. There is a decrease in ability to live independently with increasing age, a result of increasing physical and mental care needs (Berg, Browning, Hill, & Wenkert, 1970). Married elderly appear to have less likelihood of being institutionalized than single, widowed, or divorced elderly: "The presence of a well-functioning spouse may be an all-important factor in permitting continued community living and providing for needs of an incapacitated individual" (Kahana & Coe, 1975, p. 517). Ability to live independently also appears to decline with lower socio-economic status (Berg et al., 1970; Kraus, Spasoff, Beattie, Holden, Lawson, Rodenburg, & Woodcock, 1976(a)), a fact which may be attributed to generally poorer health among these people or decreased ability to purchase alternative services or suitable housing. Given the obvious importance of both health considerations and social factors, it is interesting to note

> . . . that the medical conditions of most elderly admittees to nursing homes are shared by many of the elderly persons residing in the community, but the social conditions (defined broadly to include economic status as well as family support status) of the admittees are different; and it is this, it seems, which accounts for their admission (Dunlop, 1976, p. 82).

Cultural factors may also influence the likelihood of long-term institutionalization. Fandetti and Gelfand (1976) found that residents of Italian and Polish communities favored the family as a source of care for their aged. Similarly, Eribes and Bradley-Rawls (1978) found that culture (which emphasized the family) was a factor in underutilization of nursing homes by Mexican-American elderly. They also noted that many Mexican-Americans do not survive to an age where nursing home admission is likely. With respect to Canada's ethnic population, Zay (1978) contends that the elderly who speak neither English nor French

do not make use of health and social services in the same proportion as do the rest of the population; he hypothesizes that there is a direct relationship between the use of these services and the ability to communicate. Given this evidence, it may be that culture and ethnicity are neglected variables in studies of nursing home utilization.

Another pertinent observation is that psychological characteristics or beliefs of the aged may result in resistance to accepting particular care or service modalities. The fact that older people may be more likely to consider health problems unavoidable and medical treatment unsuitable for the afflictions of old age (Ward, 1977) may decrease their propensity to seek nursing home care.

In spite of the importance of all the above patient characteristics, it appears that age because of its impact on many other factors - health and functional status, social status, income - is probably one of the most significant factors in determining need (and demand) for nursing home care. Also, because women tend to live longer than men, gender becomes another very significant variable in nursing home utilization.

Family support systems. Family values and behavior patterns are also important determinants of institutionalization. Karcher and Linden (1974) argue that "changes in the structure and function of the American family have created a need for alternative means of care for the elderly who cannot be accommodated in the nuclear family" (p. 231). They then suggest that this need is being filled by nursing homes, resulting in a large proportion of elderly who are inappropriately placed in these facilities.

Other authors (Berenson, 1977; Brody, 1977; Linn & Gurel, 1972) take issue with this point of view, claiming there is little evidence to support the notion that families "dump" their aged into nursing homes. While this may be true, one cannot ignore the forces of societal change which make it increasingly difficult for families to function as support systems for their aged. For example, demographic changes, such as decreasing birth rates, are reducing the number of descendents to whom an older person may turn for assistance, and changes in women's roles, particularly the rise in work outside the home, foster obligations which compete with duties toward aged parents (Treas, 1977). If it is assumed, though, that the family is still an important support for dependent elderly (a support which may postpone or even avoid long-term institutionalization), the corollary to this is that aged persons with growing physical dependency and without nearby family or relations are more likely to be recipients of nursing home care than are persons with such social supports.

The Health and Social Service System. As the final variable under individual determinants, certain characteristics of the health and social service system can reasonably be assumed to influence the likelihood of nursing home admission. An obvious situational variable is the amount and type of non-institutional support services in the community. Schwenger (1975) maintains that lack of community support services, such as home care programs and inadequate housing, are frequent factors leading to premature institutionalization of the elderly in Canada. On the other hand, there are factors which may impede utilization of existing services or contribute to inappropriate placement.

These latter factors include lack of coordination between institutions in placement of patients (Morgan, 1974), lack of knowledge regarding available facilities and services on the part of both health professionals and clients (Ward, 1974), and attitudes of negativism and disinterest on the part of health professionals to the elderly and to long-term care in general (Baum, 1977, p. 108; Wessen, 1964).

Finally, the admission procedures and characteristics of nursing homes themselves may influence utilization patterns. Regarding admission procedures, Dunlop (1976) suggests that where demand exceeds supply of beds, nursing home operators may be somewhat selective, choosing from among applicants those whose care involves the least cost. Alternatively, it seems possible that should a situation of excess supply occur, the result might be that nursing homes (especially private ones) might keep patients who require either higher or lower levels of care to maintain high occupancy.

Nursing home characteristics such as physical facilities, care programs, ethnic or religious affiliation, or location may also influence a patient's choice of care destination. Interestingly, in a study of patients' applications to long-term care facilities, Kraus et al. (1976,b) found that the features of institutions most frequently rated as being appealing were: good care, services, program, or staff; good physical facilities, layout or cleanliness; friendly environment or contentment of residents; and location. Although one might expect larger nursing homes to have better facilities and greater variety of staffing and patient care programs (due to greater economies of scale and higher patient numbers justifying a wider array of staff and programs), such a relationship is not supported by available

literature. Greenwald and Linn (1971) found that results in terms of staffing, physical facilities, cleanliness, and services were more favorable for nursing homes of smaller size and higher average cost. Going one step further to consider the effects of size on resident isolation and satisfaction, Curry and Ratliff (1973) reported that although the residents in the larger homes were substantially more isolated than the residents in the smaller homes, nursing home size did not influence life satisfaction to any great extent. As a final point, the availability and accessibility of nursing home beds likely presents the ultimate determinant of nursing home admission; however, of note, no studies were found which have considered explicitly the influence of bed availability on nursing home utilization patterns.

2.1.3 Summary

A model of nursing Home utilization based on the concepts of societal and individual determinants of institutionalization has been developed not only to place this analysis of nursing home utilization into perspective, but also to provide a basis for interpretation of study findings. From the foregoing review, it is obvious that many factors may influence - either indirectly as societal determinants, or directly as individual determinants - the nature and extent of nursing home utilization. These influences are well-documented in the literature, with the exception that there is a virtual lack of research regarding the influence of accessibility and availability of nursing home beds on utilization patterns. Given the importance of these factors to a patient's ultimate expression of need for nursing home care, research to clarify possible relationships is required.

As a final observation, the influences of both the societal and

individual determinants of nursing home utilization are undoubtedly continuously undergoing change. Moreover, their pervasive influences illustrate that aspects of utilization, no matter how specific, must be considered within a total framework of utilization behavior. With these comments in mind, the investigator now concentrates on literature relating to the central component of this conceptual model (and the focus of this thesis), that is, nursing home utilization.

2.2 Selected Aspects of Nursing Home Utilization

The literature contains a wealth of information from medical, sociological, and health care administration perspectives relating to utilization of nursing home facilities. In relation to the scope and objectives of this research, four topics have special significance: 1) rates of institutionalization; 2) problems of inappropriate utilization; 3) characteristics of nursing home patients; and 4) geographic perspectives in utilization. At the outset, a general limitation of the literature must be stated: Throughout the studies reviewed, there was a lack of standardized terminology with respect to the components of long-term institutional care thereby reducing the comparability of some of the research results.

2.2.1 Rates of Institutionalization

The Canadian Senate Committee on Aging (1966, p. 107) estimated that in 1962-63, 8.0 percent of the Canadian population 65 or over was in some form of health care institution (general and allied special hospitals, mental or tuberculosis hospitals, and homes for special care) rather than in the community at large. Schwenger (1975) states that in 1972-73 in Ontario, this estimate appeared to

have increased to 8.5 to 9.0 percent. Regarding Alberta's situation, Englemann et al. (1977), indicate that over 6 percent of the province's senior citizens (i.e., those age 65 or over) reside in long-term care institutions (nursing homes, auxiliary hospitals, mental institutions, and geriatric centres), with nursing homes, alone, providing care to almost 5 percent of the province's elderly. If one adds the lodges and private homes for special care, this rises to approximately 12 percent (Englemann et al., 1977).

The above Canadian figures may be contrasted with less than 5 percent of people of pensionable age in long-term care institutions in the United Kingdom in 1971 (Jefferys, 1977, p. 8), and a little over 5 percent of the elderly in institutions (nursing homes and mental hospitals) in the United States in 1971 (Special Committee on Aging of the U.S. Senate, 1974, p. 15). The similarity of these rates of institutionalization is especially interesting when one considers that in 1971 in the United Kingdom, 13.1 percent of the population was age 65 and over, compared with 9.9 percent for the United States and 8.1 percent for Canada (United Nations, 1972).

When considering the foregoing rates of institutionalization, it is important to note that the variances observed may be largely a function of the definitions of both the elderly age group and the institutions included in these statistics. It is, therefore, extremely difficult if not impossible to make meaningful comparisons. These ambiguities argue for greater clarity in expressions of nursing home utilization; specific mention must be made of the ages of persons being considered and the exact nature of institutions included in such figures.

Differences in rates of nursing home utilization are also found within the elderly population. The reality of increasing likelihood of institutionalization with increasing age is clearly shown by Zimmer (1975) who found that "while about 1.2 percent of the population aged 65 to 74 are resident in nursing and special care home in the U.S., 5.2 percent of the population aged 75 to 84 and 20.3 percent aged 85 and over are resident in such institutions" (p. 992). These figures indicate large differences in utilization patterns for different age cohorts, a phenomenon which must be considered in planning services for the geriatric population.

The meaningfulness of the foregoing rates of institutionalization in terms of indicating differences between countries or age groups in needs for nursing home care is limited not only by the above-mentioned vagaries in the figures themselves, but also by the well-known fact that not all patients in nursing homes require this type of care. Following from this statement, the next section considers a number of factors involved in the problem of inappropriate utilization.

2.2.2 Inappropriate Utilization

The degree of nursing home care found inappropriate varies considerably throughout the literature; furthermore, studies differ considerably in their methodologies and definitions of "inappropriate" versus "appropriate" placement, thereby making comparisons difficult. Taken as a whole, however, research data indicate that between 15 and 30 percent of patients in nursing homes actually could function in less supportive environments (Berg et al., 1970; Cape, Shorrock, Tree, Pablo, Campbell, & Seymour, 1977; Davis & Gibbin, 1971; Kraus

et al., 1976(b); Silberstein, Zelter, Kossovsky, & Pinkerfeld, 1970). Regarding those persons most likely to be misplaced, Berg et al. (1970) found that misplacement was more common for women, younger age groups, and people of lower social class. Silberstein et al. (1970) noted that the highest overestimation of need for nursing home care occurred in previously functionally-healthy persons who entered the nursing home via the general hospital.

There are actually three dimensions to inappropriate utilization of nursing home beds: a person may be receiving long-term care but be at an inappropriate level (misuse); a person may be unnecessarily institutionalized (overuse); or a person may require nursing home care but is not receiving it (nonuse). Most studies, as above, focus on misuse and overuse. In contrast to these, Davis and Gibbin (1971) have studied factors related to nonuse of nursing home facilities. They observed that among persons requiring nursing home care, males, persons age 65-74, and married persons were more likely than others to be lacking such care. Also, people from rural areas not in nursing homes tended to stay in their own homes, whereas people from urban areas not in nursing homes tended to remain in a general hospital (Davis & Gibbin, 1971).

The foregoing studies suggest that the concept of misplacement is not well-defined and that both environmental and individual factors are involved: for example, there may be a shortage of nursing home beds or institutional care alternatives (either higher or lower level beds), lack of community support services, misunderstandings regarding a "suitable" candidate for nursing home care, or changes in patients' care needs over time. As a result, a spectrum of patient disability levels

will inevitably be present in any institutional setting. However, this is not to suggest that steps need not be taken to curb inappropriate utilization; rather, these statements illustrate the need for mechanisms such as central assessment, classification and placement agencies which will work toward arranging the right placement for the right person at the right time. Information presented in the next section complements this discussion by further characterizing patterns of nursing home utilization.

2.2.3 Patient Characteristics

Valid comparison of information about the institutionalized elderly is difficult because of great differences in study methodologies and patient samples which give rise to the data. The accuracy of the data also depends upon the accuracy of the records and information provided by institutions in response to surveys based on administrative data. Nevertheless, the studies do provide useful insights into the characteristics of nursing home patients, insights which illustrate the inter-relationships of demographic and health characteristics and the dependency status of the elderly.

Demographic characteristics. People in nursing homes are characterized by advanced old age: almost 90 percent are age 65 and over, and the median age appears to be about 81 (Cape et al., 1977; Kovar, 1977; Zimmer, 1975). Of the institutionalized elderly, about 17 percent are 65 to 74, 40 percent are 75 to 84, and 43 percent are 85 and over (American figures provided by Kovar, 1977). Most studies indicate that women outnumber men, to an extent of almost three to one (Cape et al., 1977; Kovar, 1977; Zimmer, 1975). Fewer married

people than single, widowed, or divorced people are found in nursing homes (Barney, 1977; Lewis, 1975; Zimmer, 1975). Finally, institutionalized older people tend to have fewer economic resources than older people in general (Brody, 1977, p. 87; Kraus et al., 1976(a)).

Health characteristics. Older people in nursing homes suffer from many mental and physical disorders - inevitable sequelae of their advanced age. The salient fact about these chronic health problems is that they often result in functional disability.

The main types of chronic conditions experienced by nursing home patients appear to be circulatory disorders such as heart disease, stroke (or speech disorders associated with stroke), musculo-skeletal disorders (such as arthritis), digestive disorders, neurological disorders, and chronic brain syndrome (Gurel, Linn, Linn, Davis, & Maroney, 1970; Kovar, 1977; Krause et al., 1976(a); Silberstein et al., 1970). The result is a group in which many of the people exhibit significant dependence in relation to their activities of daily living (i.e., bathing, dressing, eating, toileting), and many have difficulties with speaking, hearing, seeing, and walking (Cape et al., 1977; Gurel et al., 1970; Kane, Olsen, Thetford, & Byrnes, 1976; Zimmer, 1975). In addition, these patients often suffer from varying degrees of mental deterioration, evidenced by forgetfulness, disorientation, and senility (Berg et al., 1970; Kraus et al., 1976a; Lewis, 1975). Of note, the above disorders are often multiple in nature and their exact nature (or cause) is often difficult to specify.

The general agreement regarding the poor health of a large number of nursing home patients suggests that these facilities are serving a relatively frail and disabled clientele. This suggestion is supported

in the following section, with the obvious importance of health-related factors as reasons for nursing home admission.

Reasons for institutionalization. According to Brody (1977, p. 93), when older people seek institutionalization, they have experienced social/health problems for which they desire a social/health solution. This statement is illustrated by the following commonly reported reasons for seeking nursing home admission: excessive burden on family members, urging by a physician, advancing age with corresponding physical disabilities, sudden illness, social isolation, disruption of previous housing arrangements, lack of more suitable care alternatives, and intervention by well-meaning outsiders (Barney, 1977; Baum, 1977; Berg et al., 1970; Kane et al., 1976(b)).

Related to the reasons for institutionalization is a person's pre-admission location. There is general agreement in the literature that most persons enter nursing homes from either private homes (either the patient's own home or that of a relative) or general hospitals (Kane et al., 1976; Silberstein et al., 1970; Special Committee on Aging of the United States Senate, 1974; Zimmer, 1975). These authors, however, cite differing figures as to which of these two locations is most frequent.

2.2.4 Geographic Perspectives in Utilization

Information regarding geographic perspectives in utilization adds another dimension to the foregoing discussion of rates of institutionalization, inappropriate utilization, and patient characteristics; that is, whereas the former studies have generally considered nursing home utilization on an overall basis, the following studies

differentiate factors involved in utilization on a geographic basis.

The Alberta Hospital Association's annual Patient Census (Management Analysis & Planning Services, 1979) provides information regarding the distribution of nursing home patients across the types of care by geographic region on a particular census day (see Table 1). The five types of care are based on the Federal Working Party Report on Patient Classification and range from Type I (ambulant persons primarily requiring supervision and/or assistance with activities of daily living, hence often suitable for care in a lodge) to Type V (patients who require acute care, care usually provided in an active treatment hospital). When interpreting these figures, it is important to note that patient classification used by this census is a fairly subjective procedure. Moreover, the unsatisfactory reliability and validity of the subjective method of classification has been documented in a recently completed project on patient classification (Bay, Overton, Harrison, Stinson, & Hazlett, 1979). Because of this, inconsistent interpretation of the guidelines for patient classification likely accounts for some of the variations in the results.

As shown in Table 1, the 1979 Census indicates that nursing homes provide care to all five types of patients. Since these facilities are intended generally as sources of care for Type II patients, it appears that a number of patients are placed inappropriately in terms of their health care needs. In addition, these data provide a gross indication of regional (urban-rural) variations in nursing home utilization; substantial differences exist in the distribution of patients by types of care both between and among the cities and the rural blocks. Factors which may be contributing to these regional variations in use include

Table 1

Percentage Distribution of Patients in Nursing Homes

by Type of Care by Region, Alberta, January 24, 1979[a]

Region	# of Rated Beds	% Occupancy	Types of Care										Total	
			I		II		III		IV		V			
			#	%	#	%	#	%	#	%	#	%	#	%
Peace River Block	356	97.8	131	37.6	187	53.7	23	6.6	1	2.1	6	1.7	348	100.0
Edmonton Block	1455	98.8	313	21.8	678	47.1	343	23.9	85	5.9	19	1.4	1438	100.0
Edmonton City	1655	98.4	285	17.5	1065	65.4	222	13.6	34	2.1	23	1.4	1629	100.0
Red Deer Block	102	96.1	9	9.2	88	89.8	1	1.0	0	0.0	0	0.0	98	100.0
Red Deer City	288	99.7	124	43.2	154	53.7	9	9.3	0	0.0	0	0.0	287	100.0
Calgary Block	277	97.8	113	41.7	121	44.6	31	11.4	3	1.1	3	1.1	271	100.0
Calgary City	2088	97.7	665	32.6	1003	49.2	347	17.0	11	0.5	13	0.6	2039	100.0
Lethbridge Block	90	100.0	21	23.3	49	54.4	18	20.0	0	0.0	2	2.2	90	100.0
Lethbridge City	309	99.7	122	39.6	144	46.8	31	10.1	4	1.3	7	2.2	308	100.0
Medicine Hat Block	50	96.0	2	4.2	23	47.9	16	33.3	7	14.6	0	0.0	48	100.0
Medicine Hat City	230	99.1	25	11.0	165	72.4	33	14.5	0	0.0	5	2.2	228	100.0
Total Alberta	6900	98.4	1810	26.7	3677	54.2	1074	15.8	145	2.1	78	1.2	6784	100.0

[a]Source: Alberta Hospital Association, Provincial Patient Census, 1979, based on a response rate of 98.7 percent of nursing homes, or 99.6 percent of nursing home beds.

the following: differing availability of, and patient access to, nursing home beds; differing availability of both community support services and institutional care alternatives; differing assessment and admission criteria; and varying amounts and types of discharge planning in other health care facilities. In view of the relevance of these factors to effective delivery of nursing home care, differences between urban and rural areas in terms of both these factors and resulting patterns of nursing home utilization deserve further study and clarification. This statement takes on added significance in view of the alleged maldistribution of nursing home beds in the province (Medicus Canada, 1978).

In the literature available to this investigator, other studies designed specifically to obtain information regarding regional differences in nursing home utilization are conspicuous by their few numbers. The study by Davis and Gibbon (1971) regarding nursing home misuse and nonuse has already been mentioned; specifically, in relation to urban-rural differences in utilization, it is interesting to note their finding that persons from an urban environment were considerably more likely to be wrongly placed in nursing homes than those from other areas. Furthermore, people from rural areas not in nursing homes tended to stay in their own homes, whereas people from urban areas were more likely to remain in general hospitals while awaiting nursing home care. Davis & Gibbon (1971) suggested these phenomena might have been due to the fact that elderly urban persons appeared to have fewer human resources (family or friends) available to provide needed social and health supports than did rural persons (rural areas, they suggested, might have had stronger "communal" feelings). However, this explanation does not take into consideration the alternative situation which involves the greater

out-migration of younger persons from rural areas than from urban areas and which may then increase both the social isolation of elderly persons remaining in rural communities and their subsequent needs for nursing home care.

Only one other study was found which considered regional differences in factors related to nursing home utilization. This study (Manitoba Department of Health and Social Development, 1975) was undertaken to provide a data base on needs of the elderly and resources available to meet these needs in the province of Manitoba. Relevant to this review is their survey of residents in long-term care facilities in Metro Winnipeg versus those in facilities throughout the rest of the province. The following findings specific to nursing homes provide interesting perspectives regarding urban-rural differences in utilization.

Regarding patient characteristics, the majority of nursing home patients were age 70 or over, with patients in Metro Winnipeg tending to be younger than non-Metro patients; overall, there were fewer males than females in nursing homes, with a lower proportion of males among patients in proprietary nursing homes outside Metro than within Metro; and there were higher percentages of facilities in the smaller cities and communities outside Metro serving particular ethnic and/or religious groups than in Metro Winnipeg. The majority of persons entered nursing homes from private homes, with slightly higher proportions of persons in Metro than in non-Metro areas being admitted from private homes. Considering patient origin-destination travel patterns, almost all patients came from the community of nursing home

location, the area surrounding this community, or a community less than a day's journey away. Interestingly, the proportion of patients who were admitted from a community outside that of nursing home location but still within a day's journey of the facility was higher for non-Metro nursing homes than for Metro facilities. This reflected the larger geographic areas served by non-Metro than Metro facilities. Finally, overall, the most common reasons for admission were security and comfort (including being close to relatives/friends) and the need for physical or mental health care, although certain differences existed between Metro and non-Metro patients: the proportion of patients with reasons for admission reflecting needs for security and comfort was higher in Metro than in non-Metro nursing homes, whereas the proportion of patients with reasons reflecting mental or physical care needs was higher in non-Metro than Metro nursing homes.

Therefore, the above findings provide further evidence regarding geographic variations in patterns of nursing home utilization.

2.2.5 Summary

The major points related to the foregoing aspects of nursing home utilization may be summarized as follows:

1) Although rates of institutionalization for long-term care vary considerably among provinces and countries, an average figure appears to be that approximately five percent of an area's elderly population receive nursing home care.
2) The likelihood of nursing home utilization increases dramatically with increasing age.
3) It is estimated that between 15 and 30 percent of patients in

nursing homes could actually function in less supportive environments. In addition, differences appear to exist between the sexes, age groups, and urban and rural settings in relation to both misuse and nonuse of nursing home facilities.

4) Patients in nursing homes are characterized by advanced old age and the presence of many mental and physical disorders which often result in functional disabilities. There is a predominance of females and nonmarried persons, with these institutionalized persons also tending to have fewer economic resources than older people in general.

5) Persons seeking nursing home admission are likely to have experienced both social and health problems, with the most common locations prior to nursing home entry being private homes and hospitals.

6) Preliminary evidence exists that patterns of nursing home utilization may differ between urban and rural settings.

In spite of the volume of literature available dealing with various aspects of nursing home utilization, one of the areas which has received minimal attention from researchers concerns geographic perspectives in utilization; questions remain regarding not only the influence of regional variations in availability of nursing home beds and other health care resources on utilization patterns, but also, the possibility of differences in need for nursing home care and resulting utilization patterns between urban and rural settings. Given this void in the literature, it is encouraging to find that one method which shows promise in providing information regarding regional differences in nursing home utilization (in terms of both patients' care-seeking

behaviors and regional variations in resource availability, rates of institutionalization, and patient characteristics) is the approach used in patient origin-destination studies.

2.3 Patient Origin-Destination Studies

Within the last fifteen years, hospital administrators, health care planners, and academic researchers have begun to study the origins of patients (their usual residences) in the hope that this spatial or geographic variable would provide information regarding patterns of health care utilization. According to Studnicki (1975(a)),

> the reasons inherent in the collection and analysis of patient origin data are fairly simple: if a hospital knows where its patients come from it should be able to monitor the populations within the geographic area and so improve the planning of its programs (p. 14).

Implicit in this statement are three uses of patient origin information: 1) to analyze patient origin-destination patterns as patients seek health care services; 2) to define service areas and service populations which may serve as planning "denominators" for individual hospitals or planning agencies; and 3) to facilitate regional analyses of health care utilization and resource availability (i.e., through small area analysis based on the areas of patient origin).

2.3.1 Analysis of Patient Origin-Destination Patterns

Analysis of patient origin-to-care location flow patterns has long been recognized as a useful method of gaining information regarding patients' care-seeking behaviors. This information could then be used in evaluating present service arrangements or planning future systems of health care delivery.

As early as 1945, Ciocco and Altenderter (1945) conducted

a patient origin-destination study (based on birth statistics) in order to establish patterns of dependence of some counties upon the medical facilities of other counties. Two ratios were used to describe the patterns of patient movement from the county of patient origin to the county of care destination: the first ratio was called the in-residence birth ratio, and it was obtained by dividing the number of births to residents which occurred within the county of origin by the total births occurring to residents; the second ratio was termed the specific out-residence birth ratio, and it was obtained by dividing the number of births to residents which occurred in a specific outside county by the total births occurring to residents. Findings from their study indicated that 18 percent of the counties were centres of medical services for 66 percent of the other counties; and for counties with few or no hospital facilities, intercounty movement increased markedly with an increase in the average income of the population.

Since this early study, many researchers with varying backgrounds (health care, geography, sociology, etc.) have examined patient flow patterns in an attempt to understand more clearly health care-seeking behaviors. A particularly well-researched study is that by Studnicki (1975b) in which he studied the influence of distance on the choice of hospital by obstetrical patients. Although there was a general pattern of distance minimization in travel, a step-wise regression analysis indicated that a number of hospital characteristics (e.g., occupancy rate, importance of the obstetrical service), as well as a patient's race, were also important in explaining admission patterns. Sharp and McCarthy (1971), in a less methodologically sophisticated approach, conducted a patient origin study based on hospital discharges

in three northwest American states. Their conclusions reflected the importance of distance on utilization: the hospital nearest his home was the patient's choice, and only patients requiring specialized services seemed to travel long distances. According to Ingram, Clark, and Murdie (1978), conventional geographical theory (i.e., utilization declines with increasing distance from a health care facility) also applied to patient utilization of emergency departments.

Distance has been a secondary consideration in other studies of patient flow patterns. As illustrated in the following articles, patient origin-destination studies have been used to describe hospital dependency patterns: Zuckerman (1977) used patient origin data to highlight changes in hospital use by residents in various communities over a ten-year period; and in a more novel application of such data, MacLean and Weldon (1977) developed a "self-sufficiency index" (based on the use of hospitals in one region by residents of another) to indicate the degree of regionalization within a hospital system. Patient origin studies have also been used to investigate the influence of sociological factors on health care seeking behavior. Examples of such studies include that by Bashshur, Shannon, and Metzner (1971) in which they examined the influence of both social variables (e.g., education, income, race) and location in choosing dentists, physicians, and hospitals, and that by Brooks (1973) in which he studied the associations among distance, patient satisfaction, and utilization of two types of inner-city clinics.

Only one study has been located which has focused on patient flow patterns in relation to nursing home care. Belk (1977) attempted to determine the value of patient origin-destination patterns and

levels-of-care patterns as planning tools for nursing home facilities in the State of Utah. Subjects for this study were all patients in nursing homes in the State as of two data collection days, one in 1974 and one in 1976. The geographic area of residence was the county, and the methodology simply involved cross-tabulation of patient origins (by county) and levels of care by either the nursing home or county of care destination. Patient movement was expressed simply as the percent of nursing home patients from the county of origin who received care in that county or specific other counties of care destination. Patient destination patterns in 1974 and 1976 revealed that most patients remained in the county from which they originated; in those counties where no nursing home facilities were available, residents often sought care in adjacent counties. Four of twenty-nine counties showed changes in both patient origin-destination patterns and level-of-care patterns over the two years. Belk suggested that such changes indicated for health planners areas requiring expanded analyses. He concluded, therefore, that patient origin-destination studies provide additional methods for obtaining meaningful information upon which planning decisions could be made.

Although the study by Belk is unique in that it applied patient origin-destination data to nursing home flow patterns, and therefore has merit in this contribution to health care research, this investigator feels that the study did not exploit the full potential of its methodology or its data analysis. No information was provided regarding characteristics of nursing home patients (other than level of care) and no attempt was made to relate patient characteristics to

utilization patterns or care levels. In addition, very little attempt was made to determine whether relationships existed between patient origin-to-nursing home flow patterns and such factors as variations in nursing home bed supply or utilization rates. Because of these limitations, this investigator feels that further application of the patient origin-destination study as one method of analyzing geographic perspectives in nursing home utilization is justified.

2.3.2 Definition of Service Areas and Service Populations

In contrast to the foregoing studies whose objective was to analyze patient origin-destination patterns in order to gain information regarding patients' care-seeking behaviors, the objective in the following studies is to use patient origin-destination data as the basis for determining service areas and service populations. The rationale for defining such areas and populations is perhaps best stated by MacStravic (1978): "Knowledge of the population to be served by a given program will determine the extent of need for services, the likelihood of utilization, and the volume of demand expected" (p. 31).

Griffith (1972, pp. 68-79) and Shonick (1976, pp. 65-67) discuss the Poland-Lembcke study, completed in 1962, as the first major study to use observed patient origin-destination patterns as the basis for delineation of hospital service areas. In this study, "a hospital service area was taken to be 'a distinctly defined geographic area containing one or more hospitals that supply most of the hospital care needs of its inhabitants'" (Shonick, 1976, p. 66). Equal-likelihood service areas were determined by grouping townships and drawing area boundaries at those points where there was an equal

likelihood that patients seeking admission would turn to the study hospital(s) versus all other hospitals combined.

Research since the Poland-Lembcke study has tended to concentrate on defining service (catchment) areas of individual hospitals, as opposed to service areas for hospital centres of one or more institutions. Many of these studies have been set in large urban areas, and patient origin data have been used to determine which hospitals serve given urban areas. In these situations, catchment areas have usually been defined in terms of small geographic units such as census tracts. Examples of such research are the studies undertaken by the Hospital Utilization Research Project in California. An early article by this group (Drosness, Reed, & Lubin, 1965) demonstrated the application of computer graphics to patient origin studies to facilitate geographic representation of service areas. Another of their studies (Drosness & Lubin, 1966) indicated that birth certificate data, which identified the movement of maternity patients to hospital, could be used as indicators of the movement of all in-patients, and hence as the basis for determining hospitals' areas of service. Patient origin data were also used by Morrill and Earickson (1968) to define urban service areas. A key finding in their study was the wide variation in the character, utilization patterns, and resulting service areas of Chicago area hospitals.

Studies by Meade (1974 and 1976) also considered service areas from the individual hospital perspective, but in contrast to the above studies, Meade's research involved hospitals in the predominantly rural state of Idaho. In this case, patients' origins were coded by zip code areas and hospitals' service areas were then determined by

amalgamating all zip code areas which supplied 60 percent or more of their patients to a particular hospital.

Basic to the concept of geographic service areas is the determination of populations within these areas. In contrast to the foregoing researchers who have concentrated on defining specific hospital service areas and then finding corresponding service populations, another school of thought has emphasized the determination of hospital service populations, with or without definition of corresponding service areas. Both approaches, however, rely on patient origin-destination information as the data base.

Griffith (1972, pp. 65-86) has made a significant contribution towards estimation of hospital service populations. He stated that the basic weakness of the equal-likelihood service area approach (as proposed by Poland and Lembcke) was that "the procedure approximates by a dichotomous decision (in the service area or out) what is actually a much more fluid reality, a continually decreasing tendency to use a given hospital as the distance from it grows" (p. 75). Griffith sought to express these realities in terms of two indices. The first index, the relevance index, referred to the proportional use of a hospital by a particular population group (e.g., the percentage of total admissions from a particular hospital district which went to the study hospital). The set of relevance indices for all districts under study would show the tendency of each area to use the study hospital. If these indices were then multiplied by the populations of each of their respective areas and totalled, the study hospital's service population could be estimated. Griffith also suggested that by appropriately shading districts on a map, it would be possible to

show areas of high relevance and moderate relevance, thereby outlining the study hospital's service area. The second index, the commitment index, referred to the proportion of total admissions to the study hospital which came from a certain area. This index provided information regarding which area's residents were actually using a particular hospital, and as developed by Griffith, it tended to be orjented mainly toward single hospital planning.

Bay, Flathman, and Nestman (1975) expanded on Griffith's work. In contrast to Griffith (and most researchers prior to that time), these researchers refined the relevance and commitment indices such that the service population of a hospital could be found without direct association with a geographic area. Also, whereas Griffith had defined the relevance and commitment indices exclusively in terms of an admission data matrix, Bay et al. expanded the model to include the use of other utilization measures, such as patient days or discharges, for the estimation of service populations. Their model also enabled them to prorate each hospital's resources, such as beds or costs, to each district served by that hospital. By combining the service population and resource allocation data, inter-hospital or inter-district comparisons of resource allocation on a per capita basis could be made.

Based on the foregoing review, it would appear - at least intuitively - that the service area/service population concept would have potential applicability to the problem in this study. One could then compare service areas with respect to per capita bed availability and patterns of utilization. However, to this investigator's knowledge, no study has been done which has applied the service area

concept based on patient origin-destination studies and relevance index methodology to nursing homes. Since patient origin data, similar to that for acute care hospitals, are available for nursing homes, this should theoretically be possible. On the other hand, it is also obvious that the number of cases or admissions, the basis for relevance index or service area calculations, is much smaller in nursing homes than in acute care settings due to the low patient turnover; moreover, the reliability of the relevance index (and resulting service area and service population estimations) is a function of the number of cases involved. For these reasons, Griffith (1976, pp. 43-44) has suggested that it is frequently more convenient to group long-term care facilities and select arbitrary areas such as counties as the service areas, instead of using relevance index methodology to determine service areas for individual nursing homes.

2.3.3 Small Area Analysis

One of the values of the patient origin-destination study as a planning tool is that it allows comparison of health resource availability, utilization patterns, and population characteristics on a small area basis (Wennberg & Gittelsohn, 1973), with the small areas referring either to the individual areas of patient origin or to groups of these areas (e.g., as in hospital service areas). In undertaking small area analyses, however, there is the caveat that area populations must be sufficiently large to provide reliable, valid, and stable statistics (Griffith, 1976, p. 45; Struening, 1974).

One of the most common parameters used in area comparisons of health resource availability remains the beds per population ratio, even though its widespread use is subject to much criticism. As

Cardwell (1964) has stated, one (of several) disadvantage(s) of a simple beds/population ratio is its implication that all beds and the population are homogeneous in relation to services required. The situation with respect to population is explicitly described by Bergwall, Reeves, and Woodside (1974, p. 105): Population size alone is inadequate for assessing health requirements; other factors must be considered such as age distribution, sex ratio, substantial urban-rural differences in need, and ethnic and cultural differences. In view of the documented increase in nursing home utilization with increasing age, attempts should be made to account for disparities in age distributions of area populations if small area comparisons of per capita nursing home bed supply are to be meaningful. Expression of nursing home beds per 1000 persons age 65 or over represents the simplest approach and corrects for differences in the distribution of elderly persons, the primary users of nursing home beds. Bed ratios based on age or age-sex adjusted area populations (as suggested by Bay et al., 1975) represent further refinements in these calculations by accounting for age, as well as sex, variations among total area populations.

Similar problems to those described above are encountered when small area comparisons are made using utilization rates based on the general population (e.g., admissions/1000 population). Griffith (1972, pp. 94-95) has suggested that one way to overcome these problems is to express utilization rates based on specific populations (for example, the population over age 65 could be used as the denominator in utilization ratios). This ratio may be further refined to an age-specific figure (Griffith, 1972, pp. 95-96), in which case

utilization rates would be calculated for various age strata (e.g., for persons below age 65, age 65-74, age 75-84, and age 85+). These age-specific rates could then be used both for comparing present utilization experiences and for forecasting demand. For the latter, each rate and each area population would be forecast independently, with the sum of the products of the individual forecasts providing the total forecast. According to Griffith (1972, p. 96), this method is largely untested as a demand predictor; no one has provided evidence that it yields an improved forecast. In contrast, MacStravic (1978) stresses that "use rates should be calculated specific to the exact age/sex population which uses a resource" (p. 97). Trends in nursing home utilization and in population growth suggest that these refinements would be applicable to nursing home statistics; however, care must be taken in defining age- (or age-sex) specific use rates to ensure that the denominator (the specific population group) is large enough to provide stable statistics. One disadvantage of age-specific use rates is that they are not very convenient for comparing regional differences in utilization. For this purpose, it may be more useful to calculate use rates based on age or age-sex adjusted area populations as suggested by Bay et al. (1975), and as described above for nursing home bed ratios.

In addition to serving as a basis for comparing health resource and utilization ratios, these small areas (or groups of small areas) provide a basis for analyzing regional variations in demographic factors (e.g., age structure, migration patterns, and socio-economic characteristics of area populations). Luce and Stamps (1976) have suggested that health care utilization experiences can then be correlated with these population characteristics, thereby permitting

periodic studies of demographic factors that influence the volume and type of health care services used. An early example of such research is provided by Roth, Acker, Roemer, and Myers (1955) who studied hospital utilization in Saskatchewan by first linking patients and their hospitalization experiences to their areas of residence and then defining profiles for areas with high versus low utilization.

2.3.4 Summary

From the foregoing description of various uses of, and developments in, patient origin-destination studies, it appears that such studies have the potential to serve as useful techniques in analyzing geographic perspectives in nursing home utilization. Three major reasons are provided in this regard:

1) By outlining patient origin-to-nursing home flow patterns, such studies provide the basis for determining where specific area's patients are going for nursing home care and, alternatively, which areas are being served by particular nursing homes.
2) Although the service area/population concept based on relevance index methodology does not appear to be feasible in the nursing home system, concepts related to both the relevance and commitment indices may be used to advantage in another way. Specifically, these indices may be employed simply to quantify patient origin-to-nursing home flow patterns, with the relevance index describing the tendency of an area's residents to use a particular nursing home and the commitment index describing the extent to which a particular nursing home serves local or non-local area residents. It is interesting to note that the ratios used by Ciocco and Altenderter (1945) in their early patient origin-

destination study were equivalent to the relevance index later developed by Griffith (1972).

3) The areas of patient origin in such studies provide a basis for regional comparisons of per capita bed supply and rates of institutionalization. These areas of patient origin may also be grouped (e.g., according to high versus low rates of utilization as was done by Roth et al., 1955) in order to permit other analyses of regional variations in nursing home utilization.

In order to place such a study into perspective with respect to the system of nursing home care in this province and previous attempts to study health care utilization through patient origin-destination studies, a review of relevant research which has been carried out in Alberta is provided in the next section.

2.4 Relevant Research in Alberta

Prior to the initiation of this research, significant and related work has been done regarding 1) provision of long-term care services and 2) application of patient origin studies and the service area/population concept to hospital utilization analyses.

2.4.1 Provision of Long-Term Care Services

In 1975, the Special Committee on Extended Care was established to develop a conceptual model which would provide a basis for systematic analysis and policy direction related to the provision of "extended health intervention services" in Alberta (these services included all health and health-related social services - institutional and community - that could not be classified as acute health intervention). Findings from beginning applications of this model and from two task

force reports (one on nursing homes and one on auxiliary hospitals) were amalgamated into a final report, Plan for the Development of Extended Health Services in Alberta (Special Committee on Extended Care, 1975). A major thrust of this report revolved around the need for a more global, long-range approach to planning in order to achieve, in the long term, improved effectiveness and efficiency of the extended health intervention system.

Three of the action steps suggested as being fundamental to achieving the above objectives were: 1) to improve the data base at the community, district, regional, and provincial levels in order to facilitate program planning and evaluation; 2) to identify research priorities based on utilization data and "at risk" populations; and 3) to ensure that the planning of programs reflects the demographic and health care needs of individual communities. In view of these comments, the present study (with its emphasis on identifying regional variations in utilization which are relevant to nursing home planning and policies) appears to be in keeping with the concerns and recommendations brought forward by this Committee in 1975.

More recently, the Medicus Canada Report (1978) has provided an analysis of current practice regarding planning guidelines for nursing homes. The methodology involved a literature review and survey of Ministries of Health in Canada and planning agencies in the United States, plus collection and analysis of data related to distribution and utilization of nursing home beds in Alberta. Certain of the Report's conclusions have specific relevance to this study.

With respect to planning methodologies for nursing home beds, the Report concluded that planning guidelines should be established

in relation to differences in need among different age cohorts of the population. These needs should be expressed in terms of beds/1000 persons under age 65, age 65 to 74, age 75 to 84, and age 85 and over. Although the Report did not attempt to translate this proposition into actual planning guidelines, this would appear to be a reasonable recommendation according to the foregoing discussion of nursing home utilization. One must not ignore, however, that such refinements require more detailed data (i.e., population projections by age would be required for estimating future bed needs) and they are more time-consuming to use.

The Report also stated that the above planning methodology should be applied to develop guidelines for individual planning areas which had been defined in relation to the catchment areas of existing facilities and traditional socioeconomic linkages among communities. Ideally, this should be the case; however, the Report did not indicate how these areas were to be determined and, as indicated in the discussion on service areas, it will be difficult to determine valid catchment areas for individual nursing homes because of the small number of patients involved. It may be more realistic to group nursing homes and surrounding areas on the basis of geographic proximity and recognized administrative boundaries such as hospital districts.

Regarding current distribution and utilization of nursing homes in Alberta, the Report found that the distribution of nursing home beds is not proportionately related to the distribution of either the general population or the elderly population. Such a conclusion is influenced, of course, by the geographical divisions used for comparison. Health units were used in this study although, in this

investigator's opinion, these were inappropriate units of analysis because authority for nursing home care is vested in hospital and nursing home districts, not in health units.

In summary, this Report provides a beginning analysis of the factors involved in developing planning guidelines for nursing homes. The present study has been designed to investigate further the alleged maldistribution of nursing home beds and its impact on resulting utilization patterns.

2.4.2 Application of Patient Origin-Destination Studies

In 1972, the Alberta Health Care System Study was conducted on behalf of the Alberta Hospital Services Commission (Paine & Wilson, 1975, pp. 63-76). The study involved analysis of the utilization of individual hospitals, designation of regional centres and health care regions according to patterns of hospital utilization (patient origin-destination patterns), and estimation of the service populations for each of the resulting health care regions. As a final step, bed requirements were determined for each region and then compared to existing supplies to assess deficiencies or surpluses in acute care beds.

Certain noteworthy features of the study included consideration of regional differences in hospital utilization (i.e., differences in lengths of stay, occupancy rates, types of cases treated) in estimating bed needs, recognition of patient inflow and outflow from the catchment areas, and inclusion of case-mix differences in the patient inflow and outflow analyses. There were also certain drawbacks with the methodology. For example, the study used census subdivisions as the geographic areas of analysis rather than hospital districts, the areas with authority for provision of acute hospital

care. Also, patient flow patterns were plotted from census subdivision of residence to subdivision of care. Because a number of census subdivisions contained more than one hospital, it became impossible to compare utilization patterns for individual hospitals. These strengths and weaknesses deserve consideration since certain aspects of the research approach taken by Paine and Wilson are not unlike that used in this study.

Bay et al. (1975), taking a more theoretical perspective with respect to patient origin-destination data and service area/service population definition, refined and extended the relevance index and commitment index methodology such that hospital service populations could be found without direct association with a geographic area, and resources allocated to hospitals or districts could be prorated to those persons actually using the resources. The premise underlying this research was that "the concept of equitable resource allocation requires matching the amount of resources available for allocation with the population to be served" (Bay et al., 1975, p. 1).

The authors applied their model to the Alberta hospital system. Example results included the following: based on inter-hospital comparisons, 25 percent of Alberta hospitals had ten or more rated beds per 1000 persons served and operating costs of over $105 per person during 1971; based on inter-district comparisons, on the other hand, bed allocation varied from 5.35 to a maximum of 15.51 with a median of 7.45 per 1000 persons in the district, and total operating costs per capita ranged from $67.06 to $161.66 with a median of $93.46. With respect to such results, the authors suggested that identification of relative surpluses or deficits in beds, costly hospitals, or areas of

high utilization may provide planners and policy makers with valuable information relevant to resource allocation decisions.

Teixeira (1975) elaborated on the application and utility of the service population model developed by Bay et al. (1975). An interesting aspect of Teixeira's work centered on his examination of the methodology used by Paine and Wilson (1975) to determine catchment area populations. According to Teixeira, the Alberta Health Care System Study's methodology was mathematically equivalent to the relevance index methodology, hence results using the two methods should be very similar. However, this did not prove to be the case; Teixeira attributed this discrepancy to differences in the geographic units of analysis (the Study used census subdivisions; the relevance index method per Bay et al. used hospital districts which were generally much smaller than the census subdivisions). With larger areas, the sensitivity of the relevance index to variations in hospital utilization may be decreased because the cross-tabulation of "patient origin by district" by "location of care by hospital or district" (the basis for relevance index determination) may be too gross.

Based on the above findings, Teixeira made two conclusions regarding geographic areas of origin or care location and hospital utilization analyses:

> The province should be divided into geographical areas such that utilization data can still be broken down by area, and there is only one institution within the boundaries of each area as far as possible.
>
> The number of geographical areas should be equal to or greater than the number of institutions in the province, where each cluster of urban hospitals counts as one institution (Teixeira, 1975, pp. 71 & 72).

These conclusions, which support the use of hospital districts or

similar geographical areas as a basis for analyzing utilization data, are relevant to the present study and the determination of patient origin-to-nursing home flow patterns.

2.5 Concluding Remarks

Based on this review of the literature pertinent to an analysis of geographic perspectives in nursing home utilization using patient origin-destination methodology, the following are the major conclusions reached by this investigator:

1) Within the conceptual model developed for this study, it is obvious that many factors, from both societal and individual perspectives, may influence nursing home utilization. Knowledge of these factors is only beneficial, however, if it is used in conjunction with utilization data to evaluate present service arrangements and utilization patterns, identify policy implications, and estimate future trends in utilization. These comments, plus the observed lack of information regarding the influence of bed availability on utilization patterns, serve to justify research efforts aimed at examining utilization patterns and their relationships to bed supply.

2) Although the literature is replete with information regarding nursing home utilization, few studies have been undertaken to assess geographic perspectives in utilization. However, since planning of nursing home services should attempt to reflect specific demographic and utilization characteristics of major areas within the province, information concerning regional variations in utilization or geographic factors relevant to

patients' care-seeking behaviors would be a valuable adjunct to planning and policy development.

3) Although patient origin-destination studies have seldom been used to analyze utilization of nursing home services, these studies appear to have utility in outlining patient origin-to-nursing home flow patterns and providing a basis for examining regional variations in rates of institutionalization and patterns of utilization. For these reasons, such a study seems to provide an ideal methodology for the purposes of this research.

4) Although there is preliminary evidence that nursing home beds are not distributed equitably throughout the province, questions remain regarding possible effects of this situation on resulting utilization patterns. Therefore, there is a need to investigate this problem further.

The methodology for this study, an extension of these conclusions and the original research objectives, is described in the next chapter.

CHAPTER III

METHODOLOGY

The following is a description of the methods employed in the design and implementation of this study. Included in this chapter are discussions of the 1) research strategy, 2) data sources, 3) procedures followed in the patient origin-destination study, and 4) factors considered in data analysis.

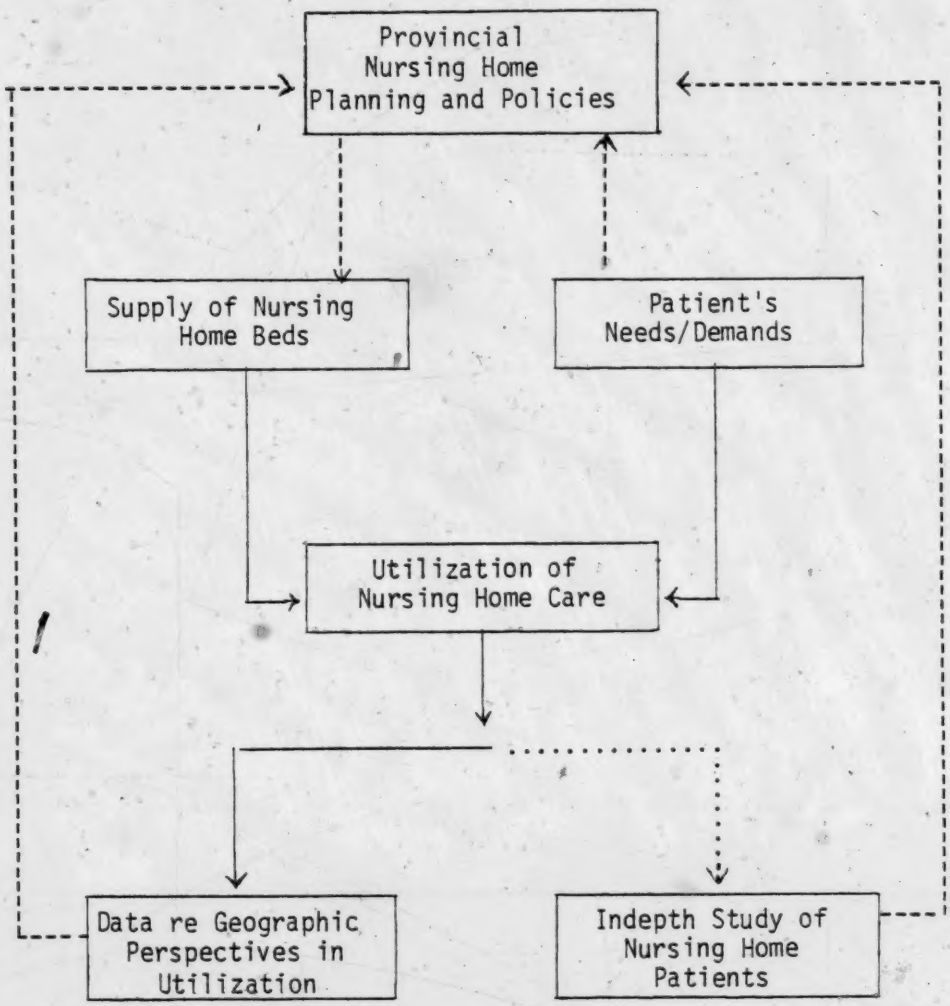
3.1 Research Strategy

The overall strategy of this research involved a province-wide analysis of geographic perspectives in nursing home utilization as evidenced through patient origin-destination study techniques. By considering where the patient came from and where the patient went to receive nursing home care, it was possible to examine patient origin-to-nursing home flow patterns, regional variations in per capita bed supply and utilization (based on the areas of patient origin), relationships between nursing home area and facility characteristics and resulting patient flow patterns, and regional variations in patient characteristics (again based on the areas of patient origin).

The specific study design is illustrated schematically in Figure 2. As alluded to above, this study of nursing home utilization involved not only consideration of patient flow patterns, but also examination of variations in bed supply and patient demand (as indicated by rates of institutionalization and selected patient characteristics) and their relationships to resulting patient flow patterns. Administrative data (routinely collected government statistics) provided the data base

Figure 2

Study Design



for this study. In relying solely on these statistics, information regarding patients' reasons for seeking nursing home care or choosing particular care locations--information relevant to these geographic perspectives in utilization--was not available; collection of such information, available only from the patients themselves, was beyond the scope of this thesis. In recognition of this limitation, a patient survey suitable for obtaining this information is outlined at a later stage of this thesis (in Chapter V). The broken lines in Figure 2 illustrate potential feedback paths to provincial nursing home planning and policy development for the information derived from both this particular study and a subsequent in-depth study of nursing home patients.

As described, this may be classified as a cross-sectional study since it was based on standard information collected at one given point in time from a predetermined population. Further, the study was basically an exploratory data analysis. Statistical inferences (or hypothesis testing) were not attempted because 1) there were few theories regarding these aspects of nursing home utilization which could serve as a basis for establishing hypotheses at the beginning of the study or attempting confirmatory analysis; 2) the study included the population of nursing home patients, hence sampling was not employed; and 3) routinely collected administrative data were used as the data bases, thus experimentation was not involved.

3.2 Data Sources

Data regarding all patients in Alberta nursing homes as of December 31, 1976, were received on computer tape from the Alberta Department of Hospitals and Medical Care. This particular date corresponded to the most recent year for which census data were available.

The following information was present for each patient: age on admission, date of birth, sex, marital status on admission, home address, location prior to nursing home admission, date of admission, and name of the nursing home. As such, this data file provided the necessary information to carry out a patient origin-destination study and a beginning assessment of patients' characteristics. This information had been abstracted from the face sheet of each patient's Assessment and Admission Form.[1] Similar data files for 1977 and 1978 were also available. This presented an opportunity to extend this study to an analysis of nursing home utilization patterns over time; however, lack of census data in these inter-census years limited usefulness of these data files.

Based on the 1976 data file, there were 6811 patients in Alberta nursing homes (the 76 nursing homes included in this study are listed in Appendix A.2). Of these patients, 129 were out-of-province residents and thus outside the scope of this study. As a result, the patient origin-destination study and subsequent analyses were based on the total population of 6682 Alberta residents who resided in nursing homes at the end of 1976.

Population statistics were required in order to determine per capita bed availability and utilization rates. Provincial demographic data in the form of age-sex distributions tabulated by hospital district (based on the 1976 census) were also received on computer tape

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[1] The Assessment and Admission Form--HS021-082, formerly AHSC 290--must be completed for each patient seeking admission to nursing homes or auxiliary hospitals in Alberta. Once a patient is admitted to one of these institutions, the face sheet is sent to the Department of Hospitals and Medical Care so that a record may be kept of all patients in these institutions. A copy of this face sheet is supplied in Appendix A.1.

from the Department of Hospitals and Medical Care. This information referred to all residents in the province as of June 1, 1976, the last Canadian census date. The difference in time periods (7 months) between the utilization data and the demographic data was unavoidable given the format of the available data; however, the effects are expected to be minimal in view of the long-term nature of nursing home care (i.e., most patients in nursing homes in June were likely still there in December, with any discharges being balanced by admissions).

Administrative data were used as the basis for this study not only because of resource and time constraints which precluded designing a special survey and gathering primary data, but also in order to evaluate the nature and value of information which could be extracted from these routinely collected nursing home statistics. At the same time, there were certain disadvantages with using administrative data. First, the information for all patients was not complete. Attempts were made to retrieve as much missing information as possible through checks with Alberta Health Care patient files, and as a result, missing values were almost completely eliminated for the variables being considered in this study. Second, patient information was very limited, thereby restricting assessment of patient characteristics to only a few basic variables. Finally, the home addresses on these files may not always be accurate identifiers of patients' true origins; they may refer to homes of family or friends which served as addresses of convenience while awaiting a nursing home bed rather than the patient's original address. However, the influence of this potential problem on study conclusions is expected to be small; these misrepresentations of a patient's true origin would likely not be sufficient to change

the direction of previous results given the consistently strong evidence supporting study findings and conclusions. Furthermore, much of the error due to this problem is likely to be of a cancelling nature whereby both rural and urban home addresses are misrepresented.

3.3 The Patient Origin-Destination Study

The patient origin-destination study was the primary methodology in this research, with the objective being to identify relationships between nursing homes and the locations of patients whom the facilities serve. As indicated in the literature review, the objective in most patient origin studies which have used relevance and commitment indices has been to determine service areas and/or service populations for individual health care institutions. In the present study, however, the emphasis was on using relevance and commitment indices simply to quantify patient origin-to-nursing home flow patterns. As such, this represented an attempt to illustrate the value and diversity in use of patient origin-destination studies and relevance/commitment index concepts in health care utilization studies. Two basic steps were involved in this study, namely selecting the area of patient origin and then identifying patient flow patterns.

3.3.1 Selection of the Area of Patient Origin

The first step in carrying out the patient origin-destination study was to divide the province into mutually exclusive and exhaustive geographical areas of patient origin. Only one nursing home was to be included initially in each area to avoid obscuring relevant patterns of utilization. An exception had to be made, however, for urban areas: to satisfy this criterion, urban nursing homes were grouped as

one, rather than being considered as individual institutions.

The nursing home data file contained several options as identifiers of patient origin including a geocode specifying range, meridian, and township of the patient's home community, the hospital district of residence, and the municipality of residence. The advantages and disadvantages of these geographic divisions are presented in a background paper to this thesis (see Appendix A.3). The conclusion reached in this background paper was that for the purposes of this study, hospital districts were the most suitable choices as areas of patient origin. Three reasons supported this conclusion:

1) Institutional health care administration in Alberta is conducted generally in relation to hospital districts (although, as described, inconsistencies exist in relation to provision of nursing home care). Use of this basic health care district allows consideration to be given to the relationship of nursing home utilization patterns to utilization of other forms of institutional health care (e.g., acute care, auxiliary hospital care) and facilitates regional planning from a system's perspective.
2) These areas are small enough to avoid sacrificing much information regarding patient flow patterns, yet large enough and of a reasonable number to permit a workable analysis. As well, they satisfy the criterion of one nursing home (or group of urban facilities) per area.
3) Hospital districts divide the province into mutually exclusive and exhaustive areas so that all areas and all persons are included in the study.

The ready availability of census data tabulated by hospital district

was an added benefit following this choice.

One limitation in using hospital districts as areas of patient origin was that they vary greatly in size and shape, hence distances travelled by patients to nursing homes may vary significantly even though patients remain in their districts of residence to receive care. In order to circumvent this problem and allow a measure of distance to be made, it would have been necessary to express patient origin as a point location (e.g., as provided by the geocode). However, incorporation of this detail in a province-wide study involving over six thousand patients would have created prohibitive data-management problems. As a result, hospital districts remained the most feasible alternative in spite of limitations inherent with their use.

3.3.2 Identification of Patient Flow Patterns

Having selected the geographic area of origin, the following analyses were carried out to identify overall patient origin-to-nursing home flow patterns (thereby providing information relevant to the first objective in this thesis):

1) By cross-tabulating patient origin by hospital district and care location by nursing home, a patient flow matrix of 76 nursing homes and 103 hospital districts was determined. As illustrated in Figure 3, this is the classic patient flow matrix (e.g., as developed by Griffith, 1972, p. 75), with each cell accounting for a particular combination of nursing home and hospital district.
2) Origins (by hospital district of residence) were then tabulated according to data in the rows of the above matrix for all patients in each of the 76 nursing homes. This provided a basis for determining which district's patients actually used a

Figure 3

Patient Flow Matrix

Nursing Home (Care Destination)	District of Patient Origin: 1	2	3 ..... j	103	Row Total
1	a_{11}		..... a_{1j}	$a_{1,103}$	$\sum_j a_{1j}$
2					
3					
i	a_{i1}		..... a_{ij}	$a_{i,103}$	$\sum_j a_{ij}$
76	$a_{76,1}$		..... $a_{76,j}$	$a_{76,103}$	$\sum_j a_{76,j}$
Column Total	$\sum_i a_{i1}$		$\sum_i a_{ij}$	$\sum_i a_{i,103}$	$\sum_{ij} a_{ij}$

Where: a_{ij} = the number of admissions to nursing home i from area of patient origin (hospital district)j

$\sum_j a_{ij}$ = total number of patients in nursing home i

$\sum_i a_{ij}$ = total number of patients from district j in nursing homes

$\sum_{ij} a_{ij}$ = total number of patients in all nursing homes in the province

particular nursing home.

3) Care destinations (by nursing home) were tabulated according to data in the columns of the above matrix for all patients receiving nursing home care from each of the 103 hospital districts. This provided a basis for determining where each district's patients went to receive nursing home care.

The second objective in the patient origin-destination study involved determining whether relationships existed between observed patient origin-to-nursing home flow patterns and such factors as nursing home bed supply, use rates, geographic location of the hospital district or nursing home, and nursing home size. For the analyses from the hospital district's perspective, the 59 hospital districts without nursing homes were combined with the 44 districts with such facilities such that there was at least one nursing home (or group of urban facilities) per Nursing Home Area (denoted as NHA henceforth in this thesis).[2] Amalgamation of hospital districts was necessary in order that all areas of the province could be credited with nursing home beds and utilization (i.e., without this aggregation step, districts without nursing homes would have been credited with zero bed availability and utilization and therefore would not have been represented in these analyses). Furthermore, this aggregation step performed a data-reduction function by reducing the number of areas in the province from 103 to 44, thereby simplifying regional comparisons of nursing home

[2] In contrast to the analyses from the hospital district's perspective (which were based on the 44 NHA's), the analyses from the nursing home's perspective relied on data for the 76 nursing homes; aggregation of urban nursing homes would have obscured information relevant to individual nursing homes and resulting patient flow patterns.

bed availability and utilization rates.

Factors considered in amalgamating the original hospital districts of patient origin into a smaller number of nursing home areas of patient origin included major patient origin-to-nursing home flow patterns (from the above analysis), geographic continuity of districts, and major travel routes and trade patterns. Once the NHA's were defined, these 44 areas of patient origin were cross-tabulated with the 44 nursing homes (the resulting number of nursing homes when urban facilities were grouped together). This resulted in a patient flow matrix identical to that in Figure 3, but with reduced numbers of nursing homes and areas of patient origin.

The methods used in analyzing the patient origin-to-nursing home flow patterns and examining area variations in bed supply and utilization are presented in the next section.

3.4 Data Analysis

In the data analysis, emphasis was placed on describing and explaining (if possible) the aforementioned geographic aspects of nursing home utilization. The specific procedures used are presented in this section.

3.4.1 Quantification of Patient Origin-Destination Data

Relevance and commitment indices were used to quantify patient origin-to-nursing home flow patterns. Since the relevance index (as used by Bay et al., 1975; Griffith, 1972; & Teixeria, 1975) describes the tendency of an area to use a particular health care facility, it was used to quantify travel patterns from the hospital district's or nursing home area's perspective. This index was

determined as follows:

Relevance Index of District to Local Nursing Home =

$$\frac{\text{\# of District's Patients in the Local Nursing Home('s)}}{\text{Total \# of Patients from the District in all Nursing Homes}} \times 100 \qquad (3.1)$$

Relevance Index of District to Other Nursing Homes =

$$\frac{\text{\# of District's Patients in Specific non-local Nursing Homes}}{\text{Total \# of Patients from the District in all Nursing Homes}} \times 100 \qquad (3.2)$$

These expressions of the relevance index were used to quantify the extent to which patients remained in their areas of origin or travelled to other areas to receive nursing home care.

The commitment index (as used by Bay et al., 1975; Griffith, 1972; & Teixeira, 1975) provides information regarding which area's residents are actually using a particular health care facility. For this reason, this index was used to quantify patient flow patterns from the nursing home's perspective, namely:

Commitment Index of Nursing Home to Local District =

$$\frac{\text{\# of Patients from Local District in the Nursing Home}}{\text{Total \# of Patients in the Nursing Home}} \times 100 \qquad (3.3)$$

(Local district refers to the district of nursing home location)

Commitment Index of Nursing Home to Other Districts =

$$\frac{\text{\# of Patients from Specific Other Districts in the Nursing Home}}{\text{Total \# of Patients in the Nursing Home}} \times 100 \qquad (3.4)$$

These expressions of the commitment index were used to quantify the extent to which nursing homes were serving patients from the area of nursing home location (i.e., local utilization) or attracting patients

from all other areas (i.e., non-local utilization).

The above indices formed the basis for describing all patient origin-to-nursing home flow patterns, as well as serving as the dependent variables in multiple regression analyses (to be discussed later).

3.4.2 Age and Sex Adjustment of Area Populations

As mentioned in earlier sections of this chapter, one aspect of the study involved comparison of nursing home bed supply and utilization among the nursing home areas. In order that comparisons of per capita bed supply and utilization rates would be meaningful, it was necessary to adjust area populations to account for age and sex disparities.

The procedure used for the population adjustments followed that employed by Bay et al. (1975). In addition to the age-sex adjustment carried out by these authors, a simpler adjustment which corrected only for age disparities was performed. Both population measures were used in order that bed supply and utilization rates based on unadjusted and various adjusted area populations could be compared. These comparisons provided indirect evidence of the influence of regional age and sex differences on the information conveyed by per capita resource allocation or utilization measures.

The desired population adjustments were accomplished by obtaining a weighted sum of the total district population according to both age and age-sex distributions, or

$$AP._j = \sum_k W_k P_{kj} \qquad (3.5)$$

where $AP._j$ is the adjusted population of hospital district j; W_k is a weight applicable to the kth age (or age-sex) group and represents a relative per capita resource requirement for serving this specific age (or age-sex) group in comparison to the total provincial population; and P_{kj} is the number of residents in the kth age (or age-sex) group in district j.

The particular weights used for this analysis were age (or age-sex) specific average rates of institutionalization; more specifically, the per capita rate of institutionalization for specific age (or age-sex) groups was divided by the per capita rate of institutionalization for the total population, or

$$W_k = \frac{NHP_{k.}}{P_{k.}} \Big/ \frac{NHP_{..}}{P_{..}} \qquad (3.6)$$

where $NHP_{k.}$ is the number of nursing home patients generated by the kth age (or age-sex) group; $P_{k.}$, the number of persons in the kth age (or age-sex) group; $NHP_{..}$, the total number of nursing home patients in the province; and $P_{..}$, the total number of persons in the province.

Summing the adjusted populations over all districts ($\sum_j AP.j$) results in the original unadjusted population ($P_{..}$) for the province, namely

$$AP._j = \sum_k W_k P_{kj} = \sum_k \frac{NHP_{k.}}{NHP_{..}} \frac{P_{..}}{P_{k.}} P_{kj} \quad \text{and} \qquad (3.7)$$

$$\sum_j AP._j = \sum_j \sum_k W_k P_{kj} = \frac{P_{..}}{NHP_{..}} NHP_{..} = P_{..} \quad \text{as it should be.}$$

Rates of institutionalization for the province were used to

determine the age (and age-sex) specific weights. As a whole, there were 6682 Alberta residents in nursing homes as of December 31, 1976, or a rate of institutionalization of 3.64 nursing home patients per 1000 capita. By dividing each age (or age-sex) rate of institutionalization by the Alberta average according to equation 3.6, weighting factors were obtained for the 9 major age groups and 18 major age-sex groups (see Table 2). For example, in the 85+ age group, there were 144 nursing home patients per 1000 persons in this age group; by dividing this by the provincial average of 3.64, a weight factor of 39.5 was obtained for this particular age group. Similarly, for males in the 85+ age group, there were 115 nursing home patients per 1000 persons in this age-sex group; by dividing this by 3.64, a weight factor of 31.6 was obtained for this age-sex group. These weights provided a measure of relative resource requirements for nursing home care. For example, persons age 40-49 required 20.7 percent of the Alberta average, whereas persons age 85+ required over 39 times the provincial average.

These weights were applied to age (and age-sex) specific population figures derived from the 1976 population file for each of the 103 districts in the manner indicated in equation 3.5. These adjusted district populations were then summed to yield the corresponding age (and age-sex) adjusted populations for each of the 44 nursing home areas.

This approach to population adjustment used weights based on age (or age-sex) specific resource requirements since it was felt that age and sex were the most relevant and accessible variables in differentiating district requirements for nursing home care. This assumption

Table 2

Age and Age-Sex Adjusting Weights*

Age Group	Age Adjusting Weights	Age-Sex Adjusting Weights	
		Male	Female
1-39	0.017	0.015	0.020
40-49	0.207	0.175	0.242
50-59	0.598	0.572	0.622
60-64	1.378	1.434	1.324
65-69	2.912	2.533	3.260
70-74	5.735	5.035	6.397
75-79	12.441	9.558	14.971
80-84	28.493	20.463	34.717
85+	39.528	31.601	46.607

is supported by the discussion of demographic characteristics of the elderly population and their relationship to nursing home utilization. Underlying this method of age-sex adjustment is also the assumption that the provincial age and age-sex specific weights approximate nursing home need levels as determined by current value judgements of policy makers. In using this "relative standard" as a basis for accounting for differences in nursing home requirements due to disparities in population structure, no attempt is made to assess the overall adequacy of nursing home bed supply or the appropriate level of utilization; rather, the present thesis is concerned only with regional variations in nursing home bed supply and utilization.

3.4.3 Determination of Per Capita Bed Supply and Use Rates

To provide information regarding the distribution of nursing home beds in the province, per capita bed supply was estimated for each nursing home area (NHA) as follows:

$$\text{NHA Bed Supply} = \frac{\text{Total \# of Beds in the NHA}}{\text{1000 Residents in the NHA}} \qquad (3.8)$$

Calculations were based on the area's unadjusted (census) population, elderly population (i.e., the over age 65 group), and age and age-sex adjusted populations. Rank correlations (Spearman's rho) were found between pairs of NHA bed supply rates, the purpose being to examine the influence of various corrections for age and sex disparities among the areas on the information conveyed by the resulting resource measures. Rank correlations close to +1 between pairs of these per capita bed figures indicated that the NHA's were ranked in almost identical order from highest to lowest, hence little difference existed in the information conveyed by the two figures.

To provide information regarding variations in rates of nursing home utilization throughout the province, per capita rates of institutionalization were determined for each nursing home area as follows:

$$\text{NHA Rate of Institutionalization} = \frac{\text{Total \# of Nursing Home Patients from a NHA}}{\text{1000 Residents in the NHA}} \quad (3.9)$$

In keeping with the cross-sectional nature of this study, this rate of institutionalization represents a prevalence rate for nursing home utilization. An alternative use measure could possibly have been the NHA admission rate (e.g., as used by Bay et al., 1975). However, it is important to note that admission rates refer to incidence rates (i.e., number of admissions per capita for a certain time period), hence are not appropriate for a cross-sectional study. In addition, in the nursing home system, per capita admission rates have the potential of understating actual use because of the low patient turnover. As with bed allocation measures, per capita rates of institutionalization were based on the area's total census population, elderly population, and age and age-sex adjusted populations. Rank correlations were also found between pairs of the use rates to examine the influence of various population adjustments on the information conveyed by the resulting use rates.

3.4.4 Relationship of Patient Flow Patterns to Nursing Home Area and Facility Characteristics

To determine whether relationships existed between patient origin-to-nursing home flow patterns and such factors as an area's bed supply, use rate, and location or a nursing home's size, ownership, and location, the investigator relied on descriptive statistics,

rank-order correlations, and multiple regression analyses. Rank correlation (Spearman's rho) was used as a measure of relationship between two variables instead of pearson's product moment correlation Coefficient because the variables being compared were in ratio form; as such, they were not additive and their means (basic to determining Pearson's r) were relatively meaningless. Multiple regression was used to analyze the relationship between a dependent variable (the appropriate relevance or commitment index) and a combination of independent variables (e.g., NHA or nursing home characteristics). The nonadditivity problem (as above for Pearson's r) was reduced by the use of case weights. Step-wise regression was used to determine the relative importance of each of the independent variables in explaining variation in the dependent variable.

For the analyses from the nursing home area's perspective (based on data for the 44 NHA's), rank correlations were found between the relevance index to local nursing home (a measure of the amount of care received by patients in their areas of origin) and 1) NHA per capita bed supply, 2) NHA rates of institutionalization, and 3) NHA bed availability (expressed as the ratio of the number of nursing home patients to the number of nursing home beds). Descriptive statistics were used to compare the relevance indices of urban NHA's (the major centres of Edmonton and Calgary plus Red Deer, Lethbridge and Medicine Hat--all cities which function as retirement centres), NHA's adjacent to Edmonton and Calgary, and rural NHA's (all other areas in the province).

In the regression analysis, the dependent variable was the relevance index of NHA to local nursing home (per equation 3.1) and the

independent variables were as follows:

1) NHA bed supply (per equation 3.8 and based on age-sex adjusted area populations).
2) NHA rate of institutionalization (per equation 3.9 and based on age-sex adjusted area populations)
3) NHA bed availability (defined as above)
4) NHA location, expressed as:
    a) Urban (defined as above, dummy variable, 1 or 0)
    b) Adjacent to Edmonton or Calgary (dummy variable, 1 or 0)
    c) Rural (defined as above, dummy variable, 1 or 0)

Due to the fact that almost one-half of the province's elderly population resides in Edmonton and Calgary (with a correspondingly high percentage of total nursing home patients), it was necessary to weight the cases in the regression analysis (with unweighted data, all cases would have been treated equally and the results would have been biased against the two large urban areas). Therefore, the cases, one for each area, were weighted according to the area's proportion of the province's elderly population. As noted earlier, this procedure makes the rates additive and the use of multiple regression analysis more meaningful.

For the analyses from the nursing home's perspective (based on data for the 76 original nursing homes), rank correlations were found between the commitment index of nursing home to local district (a measure of the amount of local utilization) and 1) nursing home size (expressed as the rated number of beds) and 2) nursing home bed availability in the district of nursing home location (expressed as the ratio of the number of nursing home patients to the number of beds

for that district). Descriptive statistics were used to compare the commitment indices of nursing homes 1) in various locations (i.e., in urban, near urban or rural areas--the areas being defined as in the preceding paragraph), 2) under different ownership (i.e., private, district, or religious), and 3) with or without accreditation from the Canadian Council on Hospital Accreditation.

In the regression analysis, the dependent variable was the commitment index of nursing home to local area (per equation 3.3), and the independent variables were as follows:

1) Nursing home size (defined as above)
2) Nursing home bed availability in the district of nursing home location (defined as above)
3) Nursing home location, expressed as:
   a) Urban (defined as above, dummy variable, 1 or 0)
   b) Adjacent to Edmonton or Calgary (dummy variable, 1 or 0)
   c) Rural (defined as above, dummy variable, 1 or 0)
4) Nursing home ownership (per Alberta Hospital Services Commission, 1977) expressed as
   a) Private (dummy variable, 1 or 0)
   b) District (dummy variable, 1 or 0)
   c) Religious (dummy variable, 1 or 0)
5) Nursing home accreditation (per Alberta Hospital Services Commission, 1977) - expressed as a dummy variable, 1 for Yes and 0 for No.

Since the 76 nursing homes varied greatly in size (from 30 to 248 beds), it was again necessary to weight the cases for the regression analysis.

This time, the cases (one for each nursing home) were weighted according to the proportion of total nursing home beds supplied by an institution.

3.4.5 Area Analysis of Patient Characteristics

In order to determine whether differences existed between areas of high and low utilization in terms of the characteristics of their nursing home patients, data regarding patients' age on admission, sex, marital status, and location prior to nursing home admission were tabulated for all patients according to their origin in areas of high or low rates of institutionalization. High rates of institutionalization were defined as being above the provincial average; low rates were defined as being equal to or below this figure. Descriptive statistics were used to analyze the data.

3.5 Summarizing Remarks

Patient origin-destination study techniques, based on administrative data obtained from the admission records of all Alberta residents in nursing homes as of December 1976, formed the basis for examining various geographic perspectives in nursing home utilization. Hospital districts were used as the geographic areas of patient origin, and patient origin-to-nursing home flow patterns were considered from both hospital district and nursing home perspectives. Relevance and commitment indices were used to quantify the patient flow data. NHA's (aggregations of the original hospital districts) formed the basis for comparing per capita bed supply and rates of institutionalization across the province and for examining the relationships between patient origin-destination patterns and various NHA characteristics.

Relationships between patient origin-destination patterns and various nursing home characteristics were based on the original ungrouped institutions. As the final step in data analysis, variations in patient characteristics were examined according to areas of high versus low utilization.

The results regarding these geographic perspectives in nursing home utilization and discussions of their implications for planning and policy formulation are presented in the next chapter.

CHAPTER IV

RESULTS AND DISCUSSION

Results from this examination of geographic perspectives in nursing home utilization are presented according to the following three steps in the analysis: 1) description of patient origin-to-nursing home flow patterns based on the 103 hospital districts and 76 nursing homes in the province; 2) examination of selected nursing home area and facility characteristics and their relationships to patient origin-destination data; and 3) comparison of patient characteristics based on areas of high versus low rates of utilization.

4.1 Patient Origin-to-Nursing Home Flow Patterns

As illustrated in Figure 4, the province of Alberta is divided up into 103 hospital districts, 44 of which have nursing home facilities within their boundaries and 59 which do not. Patient origin-destination patterns within this nursing home system are presented from the point of view of both the hospital district (the area of patient origin) and the nursing home (the care destination).

4.1.1 The Hospital District's Perspective

In response to the question, "where are patients from districts without nursing homes most likely to go for nursing home care," it appears that the majority seek care in hospital districts adjacent to (or bordering on) that of origin. Specifically, of the 704 patients from these districts (10.6 percent of total nursing home patients), 62.8 percent received care in adjacent hospital districts. Of the 262 patients who did not receive nursing home care in near-by

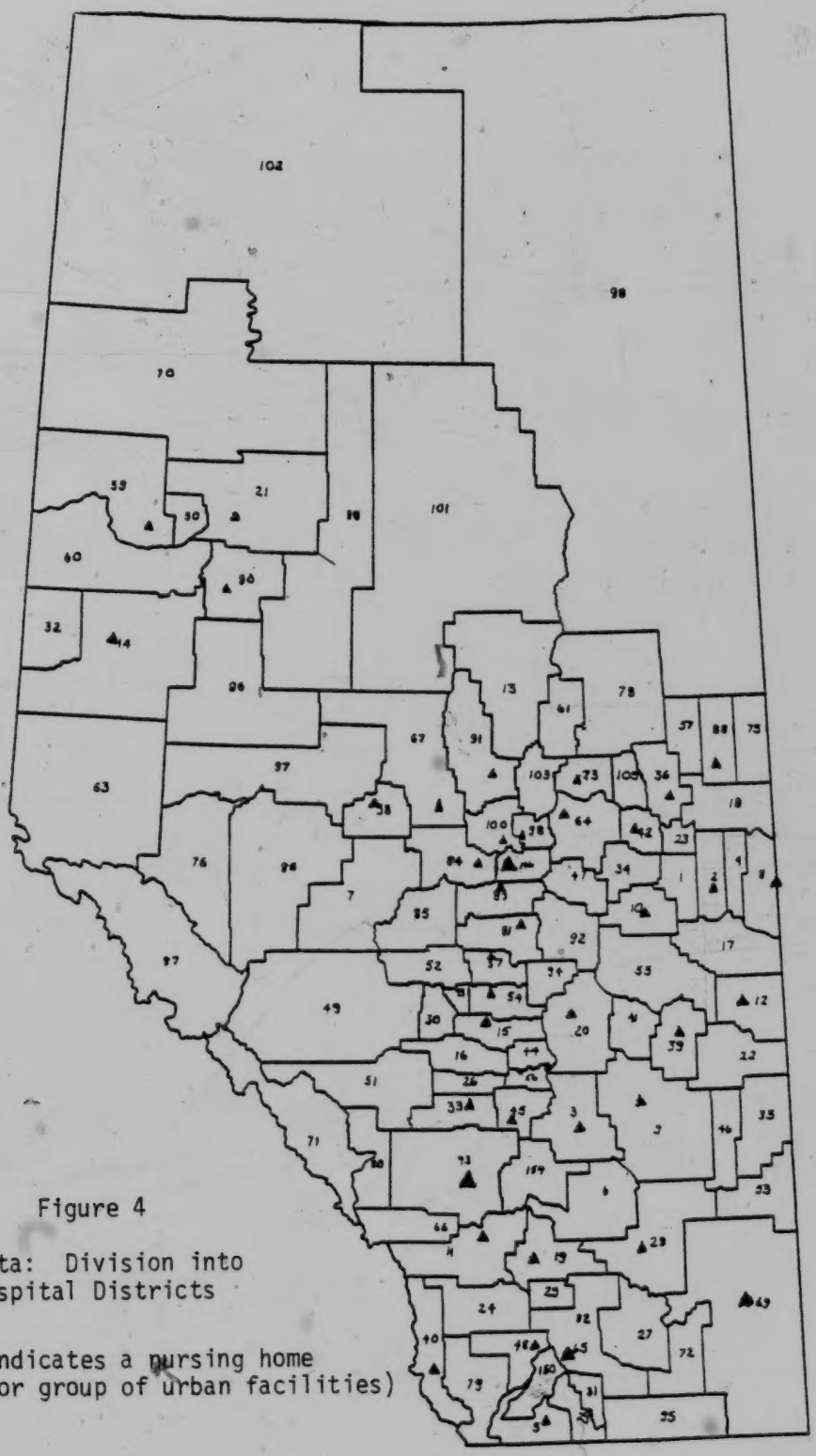

Figure 4

Alberta: Division into Hospital Districts

▲ Indicates a nursing home (or group of urban facilities)

areas, over one-half (52.3 percent) received care in the large urban centres of Edmonton and Calgary, with the remainder travelling to all other parts of the province.

From the above, it appears not only that a desire to remain near one's area of origin influences utilization patterns, but also that the urban centres of Edmonton and Calgary serve as important sources of nursing home care for patients from districts without nursing homes. The first observation agrees with that found by Belk (1977) in his study of patient origin-destination patterns for nursing home care and is in keeping with well-documented trends of distance-minimization in health care-seeking behaviours (e.g., as reported by Ingram et al., 1978; Sharp & McCarthy, 1971; & Studnicki, 1975(b)). Interestingly, the second observation tends to contradict the first since patients are being attracted to these urban centres from all parts of the province; possible explanations for this trend include inadequate supply of nursing home beds in districts adjacent to that of patient origin, rural to urban migration of medically and socially dependent persons, and movement of patients to be near family members residing in these urban centres.

Considering the hospital districts that <u>have</u> nursing homes within their boundaries, patient origin-to-nursing home flow patterns indicate that the majority of patients remain in their districts of origin to receive nursing home care. Overall for these 44 districts (with 5969 patients or 89.4 percent of all patients), 85.4 percent of the patients received care in their district of origin, with an additional 6.8 percent obtaining care in districts adjacent to that of origin. This high degree of local utilization upholds the above

statement regarding a distance-minimization approach to nursing home care-seeking behaviours.

Although the trend is definitely for most patients to use nursing homes in (or near) their districts of origin, this is not to ignore the important observation that differences do exist across the province. As indicated in Table 3, 93.4 percent of patients from Edmonton and Calgary Districts receive nursing home care in local institutions, with an additional 3.8 percent receiving care in nursing homes in adjacent districts. Obviously, there is little outflow of residents from these two major urban centres for nursing home care. In contrast, only 54.7 percent of patients from districts adjacent to Edmonton and Calgary remain in their own districts for care, with the major outflow (34.4 percent of district patients) being to Edmonton and Calgary nursing homes. The tendency for patients from all other districts to receive nursing home care in their districts of origin falls in between the foregoing two extremes; specifically, 83.9 percent of patients receive care in local facilities. Again, a fairly large amount of outflow (14.3 percent of patients) is to Edmonton and Calgary nursing homes. Within this last group of districts, it is also interesting to note that individual districts with high local relevance indexes (i.e., where 80 percent or more of a district's patients receive care in local nursing homes) tend to be associated with the smaller urban centres of Medicine Hat, Lethbridge, and Red Deer and rural and geographically distant parts of the province (e.g., the Peace River Block, areas in the northeastern, eastern, and far southern parts of the province).

Many factors (e.g., a district's bed supply, access to non-district sources of nursing home care, patient preferences regarding

Table 3

Patient Origin and Destination Patterns

from the Hospital District's Perspective[a]

Hospital Districts of Patient Origin	Nursing Homes-Care Destinations: Edmonton & Calgary	Adjacent to Edmonton & Calgary	All Other Nursing Homes	Row Total
Edmonton and Calgary	3286(93.4)[b]	132(3.8)	102(2.8)	3520(100.0)
Districts Adjacent to Edmonton and Calgary	132(34.4)	210(54.7)	42(10.9)	384(100.0)
All Other Districts	294(14.3)	38(1.8)	1733(83.9)	2065(100.0)
Column Total	3712	380	1877	5969

[a]For patients from the 44 hospital districts having nursing homes within their boundaries.

[b]Numbers in parentheses refer to the relevance index or percent of districts' patients (row total) receiving care in particular nursing homes.

care destinations, natural rural-urban migration patterns) may be contributing to the foregoing variations in patient flow patterns. However, three points related specifically to geographic characteristics of the districts appear to be important: first, the fact that the urban centres (Edmonton, Calgary, Red Deer, Lethbridge, and Medicine Hat) function as retirement centres, thereby retaining and attracting elderly persons, may explain part of the high tendency for persons in these districts to receive nursing home care in their area of origin. Second, the outflow of patients from districts adjacent to Edmonton and Calgary is a reflection of the free movement of persons between these districts and the two major urban centres; as well, patients from these districts who receive general hospital or auxiliary hospital care in the two cities may be transferred to nursing homes in these cities rather than returning to their areas of origin. Finally, the observation that patients from districts in more geographically distant parts of the province exhibit a high tendency to remain in their areas of origin for care may be due to the fact that access to alternative care resources would involve considerably longer distances and movement away from family and friends.

4.1.2 The Nursing Home's Perspective

Analogous to the foregoing consideration of patient origin-to-nursing home flow patterns from the hospital district's perspective is the question: "are most patients in nursing homes from the district of nursing home location?" The response to this question would appear to be "yes": specifically, of the 6810 patients in Alberta nursing homes, 74.8 percent are from the districts of nursing home location, with an additional 12.7 percent being from adjacent districts. This

high degree of local utilization adds support to the previous impression that nursing home utilization appears to be largely a local phenomenon.

In spite of the overall picture presented above, differences do exist among the province's nursing homes in the extent to which they serve patients from the local district (i.e., the district of nursing home location) or attract non-local district patients. As indicated in Table 4, nursing homes in Edmonton and Calgary serve a relatively local population; specifically, 85.4 percent of their patients are from the local district, with an additional 4.8 percent from adjacent districts. At the same time, these urban nursing homes attract a fairly large number of persons (9.8 percent of their patients) from more remote parts of the province. In contrast to this high degree of local utilization, nursing homes adjacent to Edmonton and Calgary serve fewer local residents, with only 45.7 percent of their patients coming from the districts of nursing home location. This is partly compensated for by a large patient inflow to these nursing homes (27.4 percent of their patients) from the two cities, thereby resulting in over 73.0 percent of "local" utilization, with the remaining 27.0 percent of patients coming from all other parts of the province. Finally, although all other nursing homes in the province (considered as a group) appear to experience a very high degree of local utilization (85.5 percent of their patients being from the districts of nursing home location), this gross tabulation obscures several important observations. More detailed calculations indicate that only 67.2 percent of patients in these latter rural nursing homes are from the local districts, with an additional 19.8 percent from adjacent districts and a final

Table 4

Patient Origin and Destination Patterns

from the Nursing Home's Perspective[a]

Nursing Homes	Districts of Patient Origin: Edmonton & Calgary	Adjacent to Edmonton & Calgary	Throughout the Rest of the Province	Row Total
Edmonton and Calgary	3286(85.4)[b]	184(4.8)	379(9.8)	3849(100.0)
Adjacent to Edmonton and Calgary	132(27.4)	220(45.7)	129(26.8)	481(100.0)
All Other Nursing Homes	294(11.9)	64(2,6)	2122(85.5)	2480(100.0)
Column Total	3712	468	2630	6810[c]

[a] For all patients in the 76 nursing homes in the province.

[b] Numbers in parentheses refer to the commitment index or percent of patients in the particular nursing homes (row total) coming from specific districts of patient origin.

[c] Includes the 129 out-of-province patients. An exception was made to the general practice of excluding these patients from this research since these patients were deemed to be relevant to a complete indication of local versus non-local nursing home utilization.

13.0 percent of patients coming from more distant parts of the province.

The above findings suggest three statements which parallel the results provided previously regarding utilization from the hospital district's perspective: First, the high degree of local utilization for urban nursing homes may be due, in part, to the tendency of urban people to remain in these centres on retirement. Second, the fact that nursing homes in Edmonton and Calgary attract a high number of non-city patients underscores the importance of these urban facilities as care resources for nonlocal patients. Third, the low degree of local utilization in rural facilities combined with the relatively high proportion of utilization from adjacent districts (most of which lack nursing homes) suggest a "regionalization" phenomenon whereby rural facilities serve as centres for care, both for patients from the district of nursing home location as well as near-by districts, in order to allow patients to remain as close to their original residences as possible. This statement corresponds to results in the Manitoba study (Manitoba Department of Health and Social Development, 1975) which suggested that rural nursing homes tend to serve larger geographic areas than do facilities in large urban centres.

4.1.3 Summary

Taken together, the results regarding patient origin-destination travel patterns considered from the hospital district's and nursing home's perspectives indicate a strong tendency for patients to seek nursing home care in their districts of origin (if that care is available) or in districts near that of origin (if nursing home care is not available locally or where the large urban centres exert a pulling force on adjacent district's residents). These findings suggest that

distance-minimization (or alternatively, a desire to obtain care in one's area of origin) is an important factor in patient origin-to-nursing home flow patterns, a conclusion in keeping with the literature on geographic perspectives in health care-seeking behaviors. Based on this observation, it would seem reasonable that consideration should be given to local or decentralized (as opposed to highly centralized) provision of nursing home services where this is economically feasible.

In spite of the overall trend toward local utilization, these results also indicate considerable movement of patients as they seek nursing home care. Thus, it is not always realistic to assume that the beds and the populations in regional bed-to-population ratios have much to do with one another. This statement has direct implications for the meaningfulness of comparisons of regional bed availability (e.g., as presented in the Medicus Canada Report, 1978), unless adjustments are made for use by nondistrict residents (as suggested by Cardwell, 1964) or the regions are of sufficient size that almost all patients receive care in their areas of origin. Furthermore, this patient movement indicates that planners should not simply add beds together to derive a regional sum; nursing home beds should be seen as having different attributes (e.g., programs offered, religious affiliations) which may influence patients' preferences for care locations, and consideration must be given to the flow of patients through the system (e.g., increased provision of nursing homes in rural areas may decrease the rural-to-urban flow of patients and thereby lessen outside demand on bed requirements in Edmonton and Calgary). Indeed, merely counting the number of beds in a specific geographic area is likely to be an insufficient basis for planning.

A number of factors have been mentioned which may be contributing to the observed patterns of nursing home utilization. However, from the hospital district's perspective, important questions remain regarding the relationship of a district's bed supply or rate of nursing home utilization to these flow patterns. Similarly, from the nursing home's perspective, salient questions remain regarding the relationship of such factors as facility size or bed availability in the district of nursing home location to the amount of local versus non-local utilization. These questions become the focus of the next section in its examination of various nursing home area and facility characteristics and their relationships to observed patient flow patterns.

4.2 Selected Nursing Home Area and Facility Characteristics and Their Relationships to Patient Origin-Destination Flow Patterns

In order to include all areas of the province in this analysis, hospital districts were combined such that there was at least one nursing home per Nursing Home Area (or NHA). This section begins with a description of these NHA's, followed by a discussion of area variations in nursing home bed supply and rates of institutionalization, and concludes with an examination of the relationships between various NHA and nursing home characteristics and patient origin-destination flow patterns.

4.2.1 Areas of Analysis

As a result of the above-mentioned aggregation, the province was grouped into 44 mutually exclusive and exhaustive nursing home areas (see Figure 5). It is important to note that unlike many studies which have used the service area concept as a basis for analyzing health care

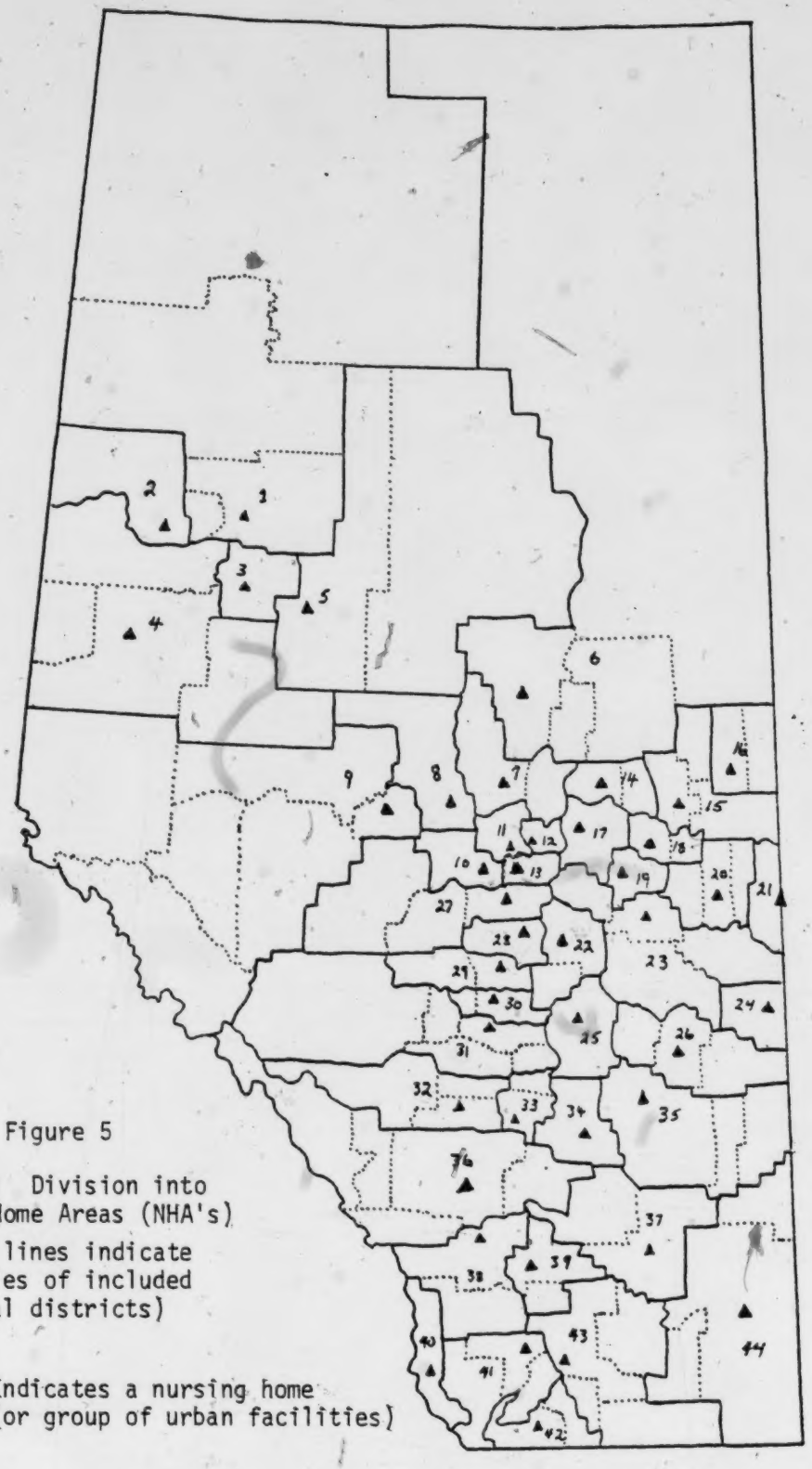

Figure 5

Alberta: Division into Nursing Home Areas (NHA's)

(dotted lines indicate boundaries of included hospital districts)

▲ Indicates a nursing home (or group of urban facilities)

utilization, these NHA's have not been defined with the major objective of ensuring that the majority of an area's residents receive care in the area's nursing home(s). Rather, one purpose of this clustering was to analyze patterns of patient movement into and out of these areas. Two aspects of these NHA's, demographic characteristics and age-sex population adjustments, are first described to provide a basis for these regional analyses of utilization patterns.

Demographic characteristics. Selected demographic characteristics of the NHA's may be highlighted as follows (complete information by NHA is provided in Appendix B.1). For the province as a whole, 7.5 percent of the total population is age 65 or over, although considerable regional variation exists in the distribution of the elderly population. As indicated in Figure 6, the highest concentrations of elderly (as percentages of the NHA's total population) are found in northeastern, central, and southern Alberta. It is interesting to note that although 55.3 percent of the total provincial population resides in Edmonton and Calgary, only 48.7 percent of the province's senior citizens are found in these large urban centres (in fact, the elderly account for only 6.5% and 6.7% of the total population in Edmonton and Calgary, respectively). This finding supports the conclusion suggested by Schwenger (1975) that there is a relatively high percentage of aged in the smaller urban centres, towns, and rural areas, a conclusion which has definite implications for nursing home distribution.

Consideration of the male to female sex ratios (also in Appendix B.1) provides additional information regarding area variations in the nature of both the general and elderly populations. Edmonton and Calgary NHA's have virtually equal numbers of males and females in their

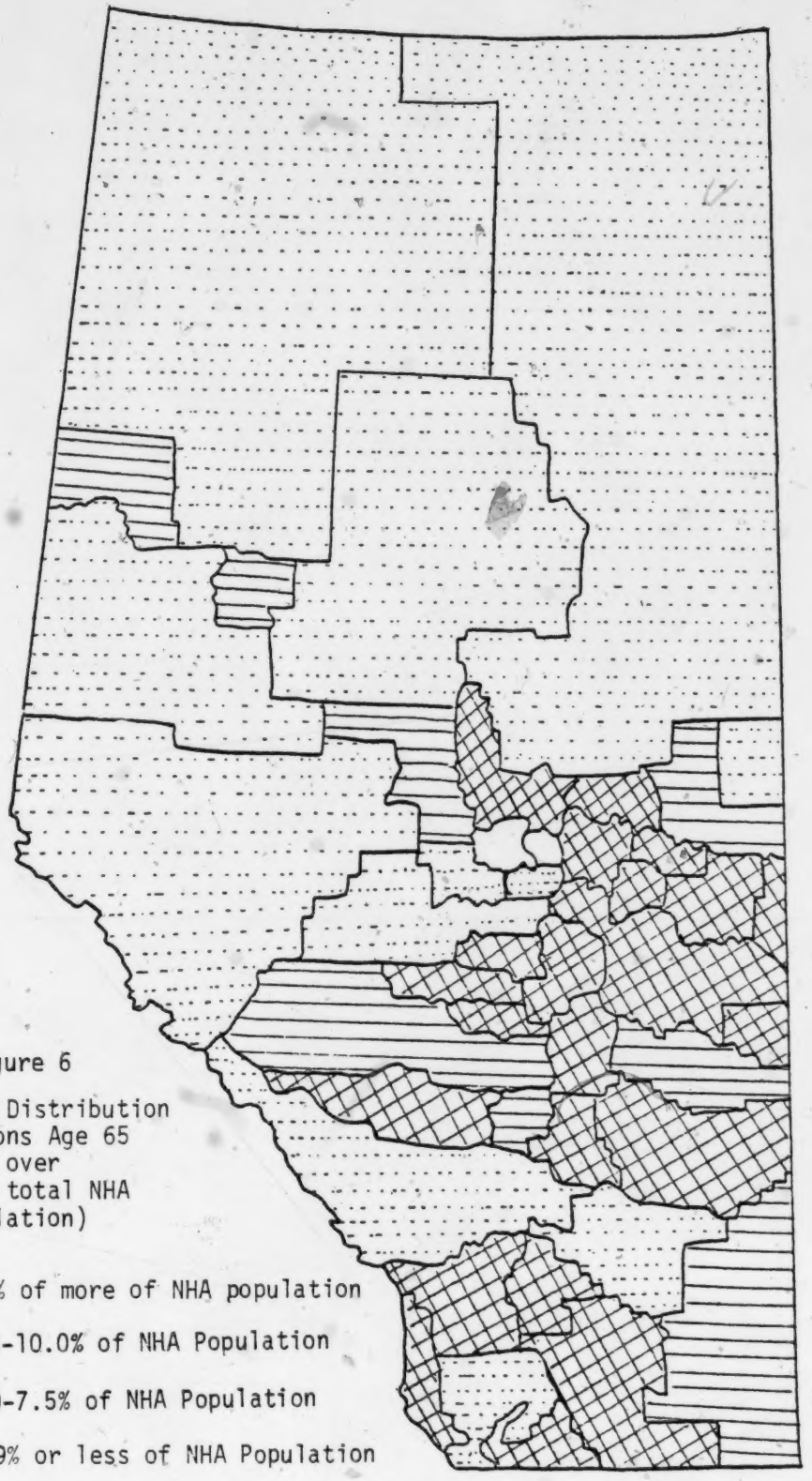

Figure 6

Provincial Distribution of Persons Age 65 or over (as % of total NHA population)

- 10% of more of NHA population
- 7.6-10.0% of NHA Population
- 5.0-7.5% of NHA Population
- 4.9% or less of NHA Population

general populations, with a high predominance of women among their geriatric populations. In contrast, most of the other NHA's have more men than women among both their total populations and elderly populations - in part, a reflection of the rural component in these latter areas. The regional differences in male to female ratios also suggest that there may be a rural-to-large urban migration of females at all ages, with a possible increase in this movement during the later years of life. The generally lower male/female sex ratio among the elderly as opposed to the total population is in keeping with the well-known trend of women to outlive men.

Age and sex adjustments of NHA populations. The variations in the distribution of the elderly population in terms of both numbers and male/female composition have potential implications for resulting patterns of nursing home utilization given the relationships of both age and gender to demand for nursing home care. For this reason, adjustment of age and sex disparities among the areas was considered necessary in order that area comparisons of per capita bed supply and rates of institutionalization would be meaningful. The unadjusted and resultjng age and age-sex adjusted area populations are tabulated in Appendix B.2. Due to the great similarity in values for age and age-sex adjusted populations (suggesting dominance of the age factor in these adjustments), further discussion is restricted to age-sex adjusted area populations.

Considering the age-sex adjusted population figures (in Appendix B.2), as expected, those NHA's with higher proportions of elderly persons are assigned an inflated population compared with the census (unadjusted) population. NHA ratios of age-sex adjusted population

to the census population range from a minimum of 0.50 to a maximum of 1.87, indicating wide variation in age and sex composition among the NHA's. In fact, only four out of 44 NHA's have an age-sex adjusted population within plus or minus 10 percent of the unadjusted population.

Problems encountered in using the simple bed/population ratio are exemplified further by the rank correlations between unadjusted and various adjusted measures of nursing home bed supply and rates of institutionalization (see Table 5). The low rank correlations between rates per 1000 persons and rates per 1000 elderly or per 1000 age and age-sex adjusted area populations indicate that major differences do exist in the information conveyed by these figures. This illustrates the difficulties associated with the simple bed/population size approach used by Medicus Canada (1978) in their study of bed distribution throughout Alberta and corroborates Cardwell's (1964) statement regarding the inadequacies of this resource measure. Interestingly, high rank correlations exist between rates based on the number of elderly persons and the age-sex adjusted area populations, indicating that little difference exists in the information conveyed by these two calculations. However, in contrast to rates based on the elderly population (which account only for variations in the distribution of elderly persons), resource allocation and utilization measures based on age-sex adjusted area populations recognize that persons below age 65 do require nursing home care (albeit to a far lesser extent than the over-65 group) and that variations in the distribution of both males and females and age groups may influence utilization.

As a result of the above findings, the following analyses of per capita bed supply and rates of institutionalization are based on age-

Table 5

Rank Correlations Between Unadjusted and Adjusted Measures of Nursing Home Bed Supply and Rates of Institutionalization[a]

	Nursing Home Bed Supply				Rates of Institutionalization			
	Per 1000 Persons	Per 1000 Elderly	Per 1000 Age-Adjusted Population	Per 1000 Age-Sex Adj. Population	Per 1000 Persons	Per 1000 Elderly	Per 1000 Age-Adjusted Population	Per 1000 Age-Sex Adj. Population
Per 1000 Persons	1.00[b]				1.00[b]			
Per 1000 Elderly	0.62	1.00			0.57	1.00		
Per 1000 Age-Adjusted	0.60	0.96	1.00		0.57	0.96	1.00	
Per 1000 Age-sex Adjusted Population	0.59	0.95	0.98	1.00	0.51	0.91	0.96	1.00

[a]Rank correlations were based on pairs of these unadjusted and adjusted measures which had been calculated for each of the 44 NHA's. The unadjusted measures refer to rates based on the NHA's census population (i.e., per 1000 persons); the adjusted measures refer to rates based on the other three population bases.

[b]Rank correlations (Spearman's rho) determine whether two rankings of the areas in terms of their per capita bed supply or rates of institutionalization are similar. Values close to +1.00 indicate much similarity (i.e., the NHA's are ranked in almost identical order from highest to lowest).

sex adjusted NHA populations.

4.2.2 Distribution of Nursing Home Beds

For the province as a whole, there are 3.8 nursing home beds per 1000 persons in the general population or 50.4 beds per 1000 elderly persons. (A complete table of per capita bed supplies by NHA, based on various population measures, is found in Appendix B.3). NHA bed supplies based on age-sex adjusted populations range from a minimum of 1.3 to a maximum of 10.0 beds per 1000 capita, with 25 of the 44 NHA's (accounting for 35.0 percent of the provincial population) having bed supplies below the provincial average of 3.8 beds per 1000 persons.

As indicated in Figure 7, all of the NHA's with bed supplies below the provincial average are located in rural parts of the province, with the majority of these NHA's being in central and southern Alberta. These are also the areas with higher concentrations of the elderly population. The large urban centres of Edmonton and Calgary have a combined bed ratio of 4.2 beds per 1000 capita, compared to 3.4 beds per 1000 age-sex adjusted population for the rest of the province. This suggests a concentration of nursing home beds in these two major cities, that is, provision of beds in centres away from areas where the majority of the elderly live. Admittedly, a number of NHA's with low bed supply are located fairly close to these cities and may rely on these centres for nursing home care with likely little inconvenience to patients and families; however, for other NHA's (especially those in northeastern, western, and eastern Alberta), fairly long travel distances would be involved to secure care in these centres. Rural NHA's with high per capita bed supply are scattered throughout the province, several of

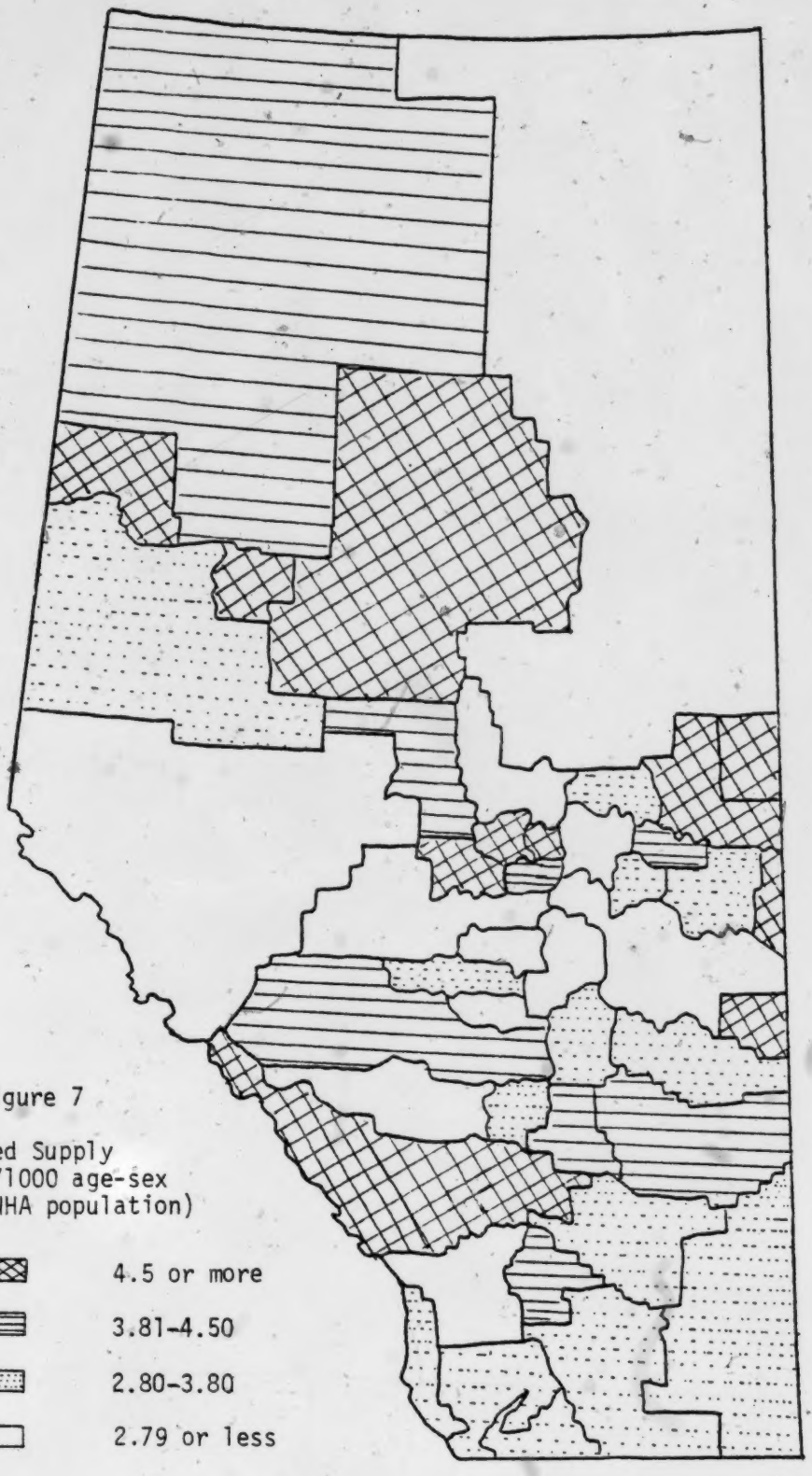

Figure 7

NHA Bed Supply
(# of beds/1000 age-sex
adjusted NHA population)

- 4.5 or more
- 3.81-4.50
- 2.80-3.80
- 2.79 or less

them being in geographically distant parts of the province.

Therefore, as concluded in earlier reports, it appears that there is some evidence to support the position that nursing home beds are not distributed equitably throughout the province. What influence this situation may have on resulting patterns of patient movement is considered following a discussion of area variations in per capita rates of institutionalization.

4.2.3 Rates of Institutionalization

For the province as a whole, there are 3.6 patients in nursing homes per 1000 persons in the general population or 48.5 patients per 1000 elderly persons. (A complete table of per capita rates of institutionalization by NHA and based on various population measures is provided in Appendix B.4). The above figures translate into the result that 4.9 percent of the elderly population is receiving nursing home care, a result corresponding to rates of institutionalization quoted earlier for the United States and Great Britain (recognizing, of course, the limitations cited for cross-country comparisons). When considering these figures, it is also important to note that they cannot be compared to existing bed supplies and then used as a means for determining the adequacy of bed supply: First, no judgement is made regarding the appropriateness of utilization as expressed by these rates of institutionalization (i.e., other than Type II patients may be included in these figures); and second, no allowance is made for unsatisfied nursing home needs (i.e., persons remaining in the community or hospitals who require such care are not considered).

Based on age-sex adjusted NHA populations, rates of institutionalization range from a minimum of 1.4 to a maximum of 10.0, with 20

of the 44 NHA's (accounting for 32.4 percent of the total provincial population) having rates of institutionalization below the provincial average of 3.6 nursing home patients per 1000 capita. As indicated in Figure 8, the majority of these NHA's are located in northeastern, central, and far southern parts of the province. The urban areas of Edmonton and Calgary have a combined rate of institutionalization of 3.9 nursing home patients per 1000 capita; in contrast, the rate for the rest of the province is 3.4 patients per 1000 persons, although a number of rural areas also experience high rates of utilization (see Figure 8).

Many factors may be contributing to these variations in rates of institutionalization; for example, there may be differences in the availability of alternate care resources and living accommodations for the elderly, supply of nursing home beds, or dependency status of persons living in urban versus rural settings. The tendency for Edmonton and Calgary areas to have high utilization rates is particularly interesting given that alternative sources of institutional and noninstitutional care should be more available in these larger centres than in smaller urban and rural areas, hence need (or demand) for nursing home care should theoretically be less. Alternatively, it is possible that there may be a selective migration (within each age-sex group) of more physically and socially dependent persons to these urban areas with the result being greater demands for health and social service supports, including nursing home care. Preliminary evidence of this phenomenon is provided by the much higher percentage of elderly females in these two centres than in other areas. On the other hand, the rate of institutionalization in these urban centres may seem high only because use rates

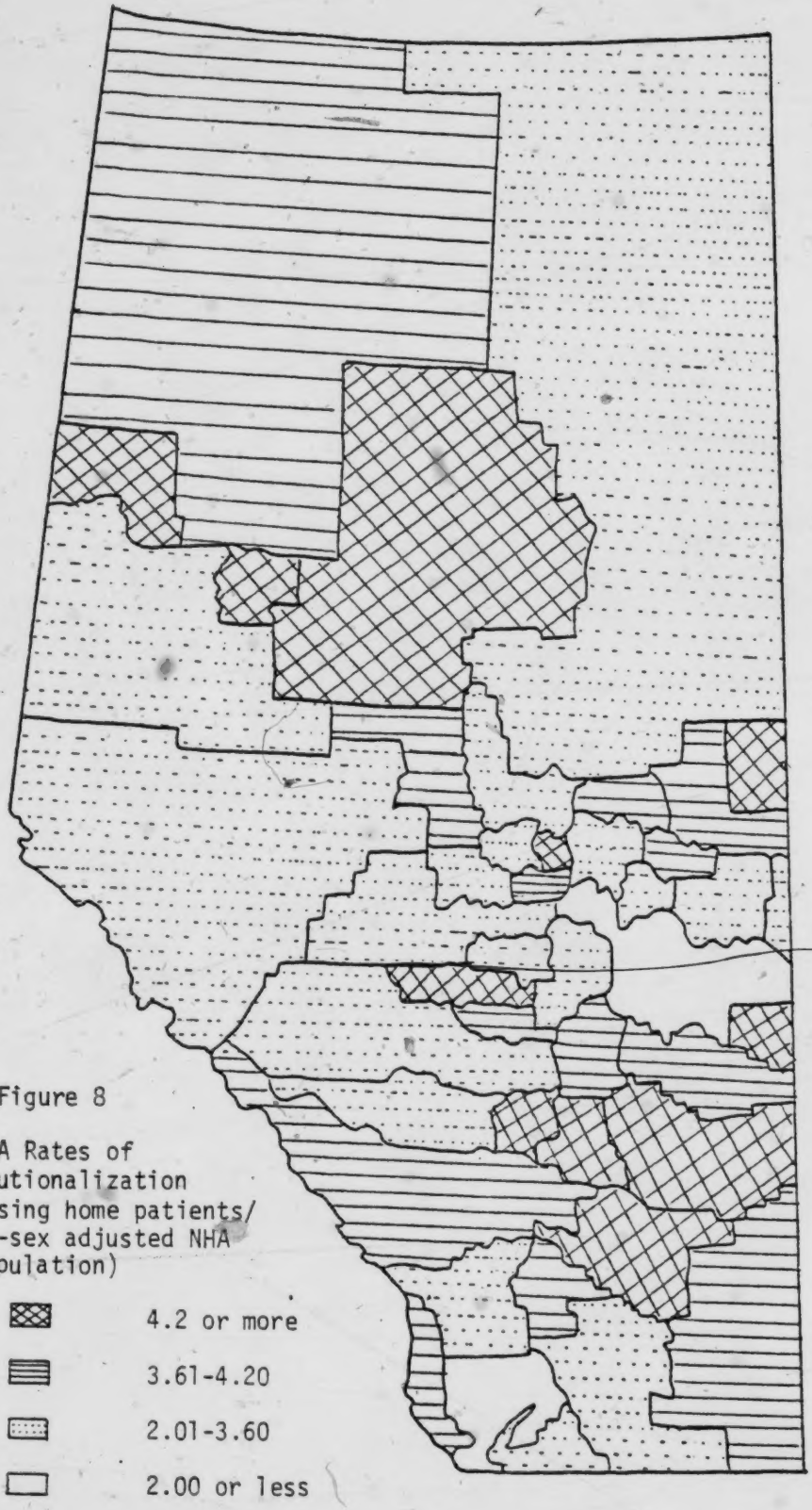

Figure 8

NHA Rates of
Institutionalization
(# of nursing home patients/
1000 age-sex adjusted NHA
population)

- 4.2 or more
- 3.61-4.20
- 2.01-3.60
- 2.00 or less

in the rest of the province are often quite low; however, whether these lower rates are due to lower levels of dependence among the rural aged, greater provision of support by rural than urban families, lower bed supplies, or long-term care being provided in general hospitals rather than in nursing homes cannot be determined from these results. Finally, it is interesting to note that the commonly cited relationship between bed supply and health care utilization (i.e., the Roemer-Feldstein hypothesis which suggests that demand for services is proportional to bed supply) appears to be partially applicable to nursing home care; a moderate rank correlation (0.68) exists between a NHA's bed supply and use rate. Additional findings relevant to these differences in rates of institutionalization are presented at the end of this chapter in a section which deals with variations in patient characteristics based on areas of high versus low utilization.

From the above analysis, it is obvious that wide variations exist among the NHA's in rates of institutionalization. Possible relationships between these variations and patient origin-to-nursing home flow patterns are considered in the next section.

4.2.4 Relationship of NHA and Facility Characteristics to Patient Origin-Destination Data

In spite of the overall trend for patients to seek nursing home care in, or near, their areas of origin and for most nursing homes to serve fairly local patient populations, variations do exist both in the tendency of patients to remain in their areas of origin for care and in the extent to which nursing homes are used by patients from the area of nursing home location or by non-local patients. This section focuses on the question of whether relationships exist between these

utilization patterns and 1) selected NHA characteristics (e.g., location, bed supply, or use rates) and 2) selected nursing home characteristics (e.g., size, or location).

The NHA's perspective. Preliminary evidence that relationships do exist between NHA characteristics and the extent to which patients remain in their areas of origin for nursing home care is provided by the following bivariate correlation and descriptive analyses.

A rank correlation of 0.52 between the relevance indices to NHA of patient origin and the NHA's per capita bed supply (age-sex adjusted) indicates a moderately strong and positive relationship between these two variables. Specifically, for most NHA's with high per capita bed supply, there is a relatively high tendency for patients to remain in their areas of origin for nursing home care; conversely, for NHA's with low bed supply, relevance indices to areas of origin also tend to be low, indicating considerable outflow of area residents for care. A major and consistent exception to these generalizations is observed in relation to NHA's located adjacent to Edmonton and Calgary; in spite of high per capita bed figures, these areas have low relevance indices, and detailed examination of patient flow patterns reveals that most of the outflow for care is to these two urban centres.

Weaker, positive relationships (rank correlation of 0.32) exist between a NHA's rate of institutionalization and the extent to which patients remain in their areas of origin for care. However, since utilization ultimately depends on availability of nursing home beds, a more meaningful indication of the relationship of utilization rates to patient flow patterns is provided by comparing NHA ratios of the number of nursing home patients to the number of beds with the

corresponding relevance indices to NHA's of patient origin. A rank correlation of -0.56 indicates a moderately strong and negative relationship between these two variables. As expected, where rates of institutionalization exceed bed supply (hence, this ratio is high), NHA's tend to experience greater patient outflow for nursing home care (hence, relevance indices to NHA of patient origin are low).

Differences in utilization patterns according to a NHA's location were described in the first section of this chapter. To restate these relationships in terms of the 44 NHA's, it is obvious that the majority of patients in most areas do remain in their NHA's of origin for care, although a few exceptions to this generalization do occur. For the larger urban NHA's (including Edmonton, Calgary, Red Deer, Lethbridge, and Medicine Hat--all retirement areas), the percent of patients receiving care in their areas of origin ranges from a low of 75.3 percent to a high of 96.5 percent. In contrast, for NHA's bordering on Edmonton and Calgary, the percent of patients receiving care in their areas of origin ranges from a low of 32.9 percent to a high of 68.0 percent, indicative of much greater patient outflow. NHA's throughout the rest of the province fall between these two extremes; the percent of rural NHA patients receiving care in their areas of origin ranges from a low of 45.3 percent to a high of 93.3 percent, with the majority of these NHA's having relevance indices of 60.0 to 85.0 percent.

Multiple regression analysis adds a further dimension to these results by estimating the degree to which differences among NHA's in the amount of care received by patients in their areas of origin can be explained by a linear combination of these NHA characteristics. In

addition, regression analysis establishes the relative importance of each of the independent variables (the NHA characteristics) in explaining variation in the dependent variable (the relevance index of NHA of patient origin to local nursing home).

The multiple regression results are summarized in Table 6. As indicated, five independent variables describing NHA location, bed supply, bed availability, and utilization rate account for 81.1 percent (R square) of variations in the dependent variable (i.e., the extent to which patients receive nursing home care in their NHA's of origin). Based on the order in which the independent variables entered the regression equation, it appears that a NHA's location (according to the previously described relationships) is the most important factor in explaining variation in the dependent variable; together, the variables describing urban and rural locations explain over 70 percent of this variation. NHA bed supply accounts for an additional 9.2 percent of variation, with a final 1.6 percent being added by factors related to NHA's rate of institutionalization. The relatively minor importance of the NHA's rate of institutionalization in terms of explained variation is a result of its correlation with bed supply (as mentioned, NHA's with high bed supply also tend to have high use rates, hence use rate variables supply little additional information in the overall analysis).

The results from this regression analysis reinforce earlier impressions that a NHA's location and bed availability are major factors influencing patient origin-to-nursing home flow patterns. This is not to ignore the realities that patients' preferences for specific care locations (e.g., in relation to a particular nursing home's facilities

Table 6

Relationships of NHA Characteristics to

Patient Origin-Destination Data[a]
(n=44)

Independent Variables[b]	Multiple R	R Square	R Square Change	Simple R	Unstandardized Regression Coefficients	Standardized Regression Coefficients
Urban NHA	0.734	0.539	0.539	0.734	31.397	0.944
Rural NHA	0.837	0.701	0.162	-0.306	17.228	0.470
NHA Bed Supply	0.891	0.794	0.093	0.535	0.392	0.028
NHA Bed Availability	0.898	0.807	0.013	-0.636	-17.848	-0.285
NHA Rate of Institutionalization	0.900	0.811	0.004	0.401	3.495	0.163
(Constant)					60.036	

[a]Stepwise Regression Analysis: Dependent variable was the Relevance Index of NHA to local nursing home.

[b]Independent variables refer to NHA characteristics as defined in Chapter III, section 3.4.5. The contribution of a NHA's location adjacent to Edmonton and Calgary to explained variance was not sufficient to be included in this step-wise regression.

and programs or a desire to be near family members), as well as natural migration patterns (e.g., rural to urban shifts) also influence these patterns of nursing home utilization. However, the finding that over 80 percent of the variation between NHA's in the extent to which patients receive care in their areas of origin is explained by these selected NHA characteristics strongly supports the conclusion that patients seek nursing home care in their areas of origin if nursing home beds are available. Where nursing home beds are not available, patient outflow for care results; most patients then seek care in NHA's adjacent to that of origin, although Edmonton and Calgary nursing homes also provide care to a large number of non-local patients.

The nursing home's perspective. Beginning evidence of relationships between selected nursing home characteristics (of the 76 study facilities) and the amount of local utilization (expressed as the commitment index of the nursing home to the local area) is provided by the following bivariate correlation and descriptive analysis.

A rank correlation of 0.34 between the amount of local utilization (or percent of patients in the nursing home from the area of nursing home location) and nursing home size indicates a weak and positive association between these two variables. The assumption in this comparison of patient origin-destination data to nursing home size was that size might reflect certain variations in the character of nursing home facilities, given that larger institutions might be able to provide better facilities, greater diversity in staffing, and greater variety in care programs and diversional activities due to economies of scale and larger patient populations. Following this assumption, it was felt that size might serve as a crude indication of the relative

attractiveness (or drawing power) of large versus small nursing homes (i.e., larger nursing homes might be expected to have a greater proportion of nonlocal use). The above result, which indicates that large nursing homes tend to experience high local utilization, contradicts this hypothesis. However, it is important to note that the larger nursing homes are all located in Edmonton and Calgary where the degree of local utilization is also high. Therefore, the above relationship may be a spurious one; further research is required to clarify these relationships.

The very weak (as well as suspect) relationship between nursing home size and patient flow patterns suggests that size may not be a very accurate indicator of nursing home attractiveness; for example, even if the nature of the facilities and staffing complements are related to size, the influence of the management capabilities and philosophies toward long-term care of those administering the nursing home may be responsible for creating an unattractive or attractive milieu in spite of the physical facilities which may be present. These statements, indicating that the relationship of size to nursing attractiveness may be much more complicated than might have been expected, echo the observations of Greenwald and Linn (1971) and Curry and Ratliff (1973) in their studies of nursing home size and related facility characteristics and patient satisfaction. Furthermore, it may be that the facilities and reactivational/diversional programs provided by a nursing home are not major factors in a patient's choice of care location. Rather, a desire to remain in one's community of origin, to move to be near family, or simply to obtain any nursing home bed that is available may be more important in influencing the extent to which

patients in the nursing home are from the local area than is a nursing home's size (and what it may/may not represent). Beginning evidence of this latter proposition is presented in the next analysis.

As indicated by a rank correlation of 0.59, there is a moderately strong relationship between the proportion of local patients in a nursing home and bed availability in the district of nursing home location (since these analyses are based on the original 76 nursing homes, the areas of nursing home location refer to the ungrouped hospital districts). More specifically, nursing homes located in districts where rates of institutionalization are high compared to bed supply tend to have high local use (most of the patients are from the district of nursing home location since there are few beds left for nonlocal use); alternatively, nursing homes located in districts where use rates are lower than bed supplies experience higher use by non-local patients. In essence, patient in-flow follows bed availability.

Differences in patient flow patterns according to a nursing home's location were described in the first section of this chapter. To summarize the results briefly, nursing homes located in the urban areas (i.e., in Edmonton, Calgary, Red Deer, Lethbridge, and Medicine Hat, and considered as a group) experienced over 80 percent local utilization; nursing homes located in districts adjacent to Edmonton and Calgary, taken together, experienced 45.7 percent local utilization; and rural nursing homes experienced an overall percentage of local utilization of approximately 67.0 percent (although considerable variation existed among individual institutions, with the amount of local utilization ranging from 25.3 percent to 96.7 percent). Therefore, whereas nursing home utilization in urban institutions is primarily a

local phenomenon, near-urban and rural nursing homes tend to have fairly large proportions of nonlocal clients (the former receiving considerable inflow from the cities which they border, and the latter attracting patients from neighboring rural areas).

Examination of patient flow patterns in relation to nursing home ownership provides additional information regarding the influence of facility characteristics on patients' care-seeking behaviors. Results for privately owned and district (or public) nursing homes are very similar, hence are considered together: for these facilities, the percent of local utilization ranges from a low of 26.0 percent to a high of 96.7 percent, with the majority of institutions experiencing 75.0 to 95.0 percent local utilization. In contrast, for nursing homes operated under religious auspices, local utilization ranges from a low of 40.0 percent to a high of 84.2 percent, with the majority of institutions having less than 75 percent local utilization. The greater amount of nonlocal use experienced by religious nursing homes indicates that these facilities appear to have larger catchment areas than either private or district institutions; this provides preliminary evidence that nursing home characteristics do influence patient origin-to-nursing home flow patterns.

Finally, little difference appears to exist in patient flow patterns for nursing homes which are, or are not, accredited by the Canadian Council on Hospital Accreditation. For accredited institutions, the percent of patients from the district of nursing home location ranges from a low of 40.0 percent to a high of 96.7 percent, with the majority of homes having commitment indices of 75 to 95 percent. Similarly, for nonaccredited institutions, local utilization ranges from a

low of 26.0 percent to a high of 93.5 percent, with most facilities having commitment indices of 75 to 90 percent. Theoretically, one might assume that accredited institutions would have better facilities and patient care programs and hence would be more attractive to non-local residents. On the other hand, it may be that a number of nursing homes which could also qualify for accreditation simply have not taken the initiative to apply, thereby obscuring possible relationships of patient flow patterns to accreditation status.

Following from this consideration of various nursing home characteristics on an individual basis, multiple regression may be used to estimate the extent to which differences among nursing homes in the amount of local (or nonlocal) utilization may be explained by a combination of these nursing home characteristics. As presented in Table 7, seven independent variables describing nursing home characteristics explain 77.8 percent (R Square) of the variation among nursing homes in their percent of local utilization. Based on the order in which the independent variables entered the regression equation, location of the nursing home (according to the foregoing relationships) appears to be the most important factor in explaining variations in this aspect of nursing home utilization: the first three variables--urban location, bed availability in the district of nursing home location, and location adjacent to Edmonton or Calgary--together explain 74.1 percent of variation in the dependent variable. Nursing home characteristics such as religious ownership and size contribute an additional 2.4 percent to explained variance; nursing home accreditation and private ownership make negligible contributions to the overall regression analysis.

Table 7

Relationships of Nursing Home Characteristics

to Patient Origin-Destination Data[a]
(n = 76)

Independent Variables[b]	Multiple R	R Square	R Square Change	Simple R	Unstandardized Regression Coefficients	Standardized Regression Coefficients
Urban Location	0.572	0.327	0.327	0.572	9.483	0.270
Bed Availability (in District of Nursing Home Location)	0.780	0.609	0.282	0.562	49.812	0.590
Located Adjacent to Edmonton or Calgary	0.861	0.741	0.132	-0.492	-23.311	-0.380
Religious Ownership	0.870	0.757	0.016	-0.211	-7.837	-0.178
Size	0.880	0.775	0.018	0.421	0.042	0.158
Accredited	0.882	0.778	0.003	-0.014	2.363	0.068
Private Ownership	0.882	0.778	0.001	0.183	0.415	0.013
(Constant)					21.856	

[a]Stepwise Regression Analysis: Dependant variable was the Commitment Index of Nursing Home to Local Area.

[b]Independent variables refer to nursing home characteristics as defined in Chapter III, section 3.4.4. The contributions of rural location and district ownership to explained variance were not sufficient to be included in this step-wise regression.

The importance of nursing home location in the regression analysis emphasizes the previously discussed tendency for urban nursing homes to serve a predominantly local clientele and for near-urban nursing homes to experience low local utilization with a high amount of inflow from both the near-by cities and more distant parts of the province. A major factor influencing patient flow patterns is bed availability in the district of nursing home location; where bed supply exceeds the nursing home use rate, there is an influx of nonlocal patients seeking nursing home care. The contributions of nursing home ownership, size, and accreditation status in the regression analysis (although small in comparison to the above locational variables) are important since they indicate that facility characteristics do influence patient origin-to-nursing home flow patterns.

Other factors which may also influence the extent to which nursing homes serve a local or nonlocal clientele include distance to alternative sources of care, bed availability in adjacent districts, central placement processes and admission policies of particular nursing homes, and patient preferences regarding specific care locations. However, the fact that almost 78 percent of the variation in the amount of local utilization among nursing homes can be explained by the nursing home characteristics considered in this study underscores their importance as influences in patient origin-to-nursing home flow patterns.

4.2.5 Summary

The relationships between patient origin-to-nursing home flow patterns and selected NHA and nursing home characteristics may be summarized as follows:

1) A NHA's location and bed availability are major factors influencing the extent to which patients receive care in their areas of origin. With the exception of NHA's adjacent to Edmonton and Calgary (where there is considerable patient outflow to these urban centres), patients tend to seek care in their areas of origin if nursing home beds are available.

2) A nursing home's location appears to be important in relation to the percent of patients who are from within or outside the district of nursing home location: urban nursing homes serve primarily a local population; nursing homes adjacent to Edmonton and Calgary experience patient inflow from these two cities; and rural nursing homes tend to serve a fairly local population, although the area served may extend beyond the immediate area of location since many rural facilities attract patients from neighboring areas. Bed availability (i.e., supply relative to utilization in the district of nursing home location) is a major factor influencing these flow patterns.

3) Characteristics of nursing homes (e.g., ownership, size, and accreditation status) also influence, albeit weakly, patient origin-to-nursing home flow patterns. This suggests that in planning nursing home services or assessing bed availability, nursing homes must not be considered as generic facilities; rather, they must be seen as having different attributes which may influence resulting utilization patterns.

The very evident phenomenon of local utilization, plus the importance of bed availability in explaining patient origin-to-nursing home flow patterns, corroborates the earlier suggestion that in planning

future distribution of nursing home beds, attempts should be made to bring nursing homes as close to patients' own homes and communities as is economically possible. In doing so, consideration would have to be given to the impact that this would have on bed requirements in Edmonton and Calgary since these centres currently provide nursing home care to a fairly large number of nonlocal residents. Given the strength of the relationships uncovered in this analysis, it would seem logical that this rural-to-urban movement for nursing home care might decrease as nursing home beds became more available in rural areas. However, the many other factors also influencing nursing home utilization argue against making a firm statement in this regard; rather, rural-to-urban migration of nursing home patients remains an area for monitoring and for further research and clarification.

Examination of bed supply and use rates across the province has indicated that variations exist in both per capita bed supply and rates of institutionalization. As might be expected, areas with high bed supply also tend to have high use rates. It is important to note, however, that the information conveyed by per capita bed supply figures or use rates depends on the population used for computation. To obtain maximally useful results in area comparisons of bed allocation or utilization, steps should be taken to account for age and sex disparities in area populations. Available methods include basing calculations on the elderly population (which accounts for variations in the distribution of the elderly population, the primary users of nursing homes) or age-sex adjustment of area populations (which accounts for age and sex variations in total area populations). A priori, one might assume that more refined, adjusted rates would provide the most

accurate measures of bed supply or use rates. However, the high rank correlations between results based on the over-65 age group and those based on the adjusted NHA populations indicate a high degree of similarity in the information conveyed by these various figures. As a result, the time and extra information required to determine age-sex adjusted area populations may not always be warranted; rather, bed allocation and use rates based on the elderly population appear to provide a satisfactory basis for most routine planning activities.

In response to the wide variations in rates of nursing home utilization, an analysis of selected patient characteristics and their relationships to areas of high versus low utilization is provided in the next section.

4.3 Area Variations in Patient Characteristics

This section provides a descriptive analysis of variations in patient characteristics between areas of high utilization (i.e., those with rates above the provincial average of 3.6 nursing home patients per 1000 age-sex adjusted population) and areas of low utilization (i.e., those with rates equal to or below the provincial average). The high-use areas are divided into two groups, one for Edmonton and Calgary area patients and the other for rural area patients so that comparisons may be made between the large urban and non-urban areas. All areas experiencing lower rates of institutionalization are in rural Alberta, hence are considered together. Table 8 contains a summary of selected characteristics of these areas. Of particular interest is the fact that the low-use areas have lower overall nursing home bed supplies than do either of the high-use areas. (A map illustrating these areas is also provided in Appendix B.5). Patient

Table 8

Characteristics of High-Use and Low-Use Areas

Area	# of NHA's (# of nursing homes) contained in the area	Age-Sex Adjusted Population (A)	# of Nursing Home Beds (B)	# of Patients Originating From Area (C)	Bed Supply[c] (B/A x 1000)	Rate of Institutionalization[d] (C/A x 1000)
HIGH-USE[a]						
-Edmonton Calgary	2 (34)	922,633	3862	3588	4.19	3.89
-Rural	22 (22)	218,838	1297	1336	4.07	4.19
LOW-USE[b]						
-Rural	20 (20)	594,068	1792	1758	3.02	2.96
Alberta	44 (76)	1,835,539	6951	6682	3.80	3.61

[a]High-Use areas refer to the group of NHA's with rates of institutionalization above the provincial average of 3.61. This group is subdivided further into 1) Edmonton and Calgary and 2) all other NHA's with high use rates, under the designation of "rural".

[b]Low-Use areas refer to the group of NHA's with rates of institutionalization equal to or below the provincial average. All areas are nonurban, hence are considered as one "rural" group.

[c]Refers to # of nursing home beds per 1000 age-sex adjusted population.

[d]Refers to # of nursing home patients originating from the area per 1000 age-sex adjusted population.

characteristics available for examination in the following analyses include admission age, sex, marital status, and location prior to nursing home admission.

4.3.1 Age on Admission

Analysis of the age distribution of patients on admission to nursing home indicates interesting differences between areas experiencing high versus low rates of institutionalization. According to results in Table 9, patients from areas with low use rates tend to be older on admission than patients from areas with high use rates; not only are the median and modal ages higher, but also, the proportions of moderately-old (75-84 years) and old-old (85+ years) patients being admitted in the low-use areas are higher than in the high-use areas. Little difference in patients' admission age exists between the rural and urban high-use areas.

A number of possible explanations may be offered in relation to the above findings. First, the observation that the areas with low utilization generally also have low bed supplies suggests that patients in these areas may be older on admission as a consequence of waiting longer for nursing home placement or delaying nursing home application until absolutely necessary due to a lack of beds in their areas of origin. Related to this suggestion is the possibility that in these low-use areas, other health care facilities (e.g., general hospitals, auxiliary hospitals, lodges) may be providing certain amounts of long-term care to area residents, thereby postponing, or even preventing, nursing home admission. Third, the lower admission age plus higher use rates in Edmonton and Calgary may be due to the presence of more

Table 9

Age on Admission of Patients from

High-Use and Low-Use Areas

Area	Median[a]/Mode[b]	Age Group (in years)				Total Area Patients
		Less than 65	65-74	75-84	85 or more	
HIGH-USE						
-Edmonton & Calgary	80/84 yrs.	471 (13.1)[c]	671 (18.7)	1476 (41.1)	971 (27.1)	3859 (100.0)
-Rural	79/83 yrs.	212 (14.4)	311 (21.1)	576 (39.1)	373 (25.3)	1472 (100.0)
LOW-USE						
-Rural	81/89 yrs.	205 (12.6)	302 (18.6)	653 (40.3)	461 (28.4)	1621 (100.0)
Alberta	80/85 yrs	888 (13.3)	1284 (19.2)	2705 (40.5)	1805 (27.0)	6682 (100.0)

[a]Median is the value of the middle case once all cases have been rank ordered from highest to lowest.

[b]Mode is the value of the variable which occurs most often.

[c]Numbers in parentheses indicate percent of total area patients in a particular age group.

socially and medically dependent persons in these areas, both in the geriatric age groups (due to a rural-to-urban migration of more dependent persons) and in the younger age groups (due to a higher number of handicapped persons). This proposition has merit given that these patterns of use occur in spite of the fact that noninstitutional care alternatives (which should postpone or even prevent nursing home admission) are likely to be more available in these two cities than in other parts of the province. Finally, the difference between rural areas is more difficult to explain other than to suggest that these results may be due to generally greater bed availability in high-use areas which facilitates earlier and higher rates of institutionalization.

Patterns of nursing home utilization in relation to age on admission may also be expressed in terms of age-specific rates of institutionalization. Per capita use rates by age group (i.e., for persons less than 65 years, 65-74 years, 75-84 years, and 85 or more years) are provided in Table 10. As expected, use rates for the high-use areas are greater than those for the low-use areas for all age categories. It is interesting to note the much lower per capita rates of institutionalization for moderately-old and old-old persons in the low-use areas. These use rates, when considered along with the previous finding that patients from these areas are older than others on admission, again suggest either that the generally lower bed supply in these areas may be preventing some people from receiving nursing home care, or that a number of older people in these areas may be cared for in health facilities other than nursing homes or by family and friends, thereby reaching nursing homes in fewer numbers and at older ages.

Overall, the age-specific use rates indicate that the likelihood

Table 10

Age-Specific Rates of Institutionalization[a]
for High-Use and Low-Use Areas

Area	Age Groups (in years)			
	less than 65	65-74	75-84	85 or more
HIGH-USE				
-Edmonton & Calgary	0.36	12.02	60.00	249.57
-Rural	0.48	14.27	57.78	239.03
LOW-USE				
-Rural	0.32	8.67	41.60	201.7
Alberta	0.37	11.56	55.73	236.42

[a]Determined according to:

$$\frac{\text{\# of Nursing Home Patients in an age group originating from the area}}{\text{1000 Persons in that age group}}$$

of admission to nursing homes increases dramatically with increasing age, the patterns of increase being very similar to those described by Zimmer (1975) for nursing home patients in the United States. The trend for high numbers of moderately-old and old-old persons to be admitted is in agreement with the well-known increase in the disability level of the elderly around age 75 (e.g., as described by Berg et al., 1970; Kovar, 1975). Finally, these patterns of utilization strongly support the recommendation made in the Medicus Canada Report (1978) regarding the use of cohort-specific planning guidelines to account for differences among various age groups in need/demand for nursing home care.

4.3.2 Sex

As indicated in Table 11, females outnumber males in both high and low-use areas, although the differential between the sexes varies between rural and urban areas.

The predominance of females corresponds to nursing home experiences reported in the literature and is primarily a result of the longer life expectancy of women, hence their greater numbers in old age and higher likelihood of health and social dependency. The higher proportion of females being admitted in Edmonton and Calgary is likely a reflection of the fact that these cities have much higher proportions of elderly females in their general populations than do other areas of the province. This latter situation may be contributing to their higher rates of institutionalization in view of the facts that elderly women are more likely to be nonmarried than men and therefore lacking the social support of a spouse, and that higher proportions of women than men are

Table 11

Sex of Patients from High-Use and Low-Use Areas

Area	Sex		Total Area Patients
	Male	Female	
HIGH-USE			
-Edmonton & Calgary	1217 (33.9)[a]	2372 (66.1)	3589 (100.0)
-Rural	636 (43.2)	836 (56.8)	1472 (100.0)
LOW-USE			
-Rural	647 (39.9)	974 (60.1)	1621 (100.0)
Alberta	2500 (37.4)	4182 (62.6)	6682 (100.0)

[a]Numbers in parentheses indicate percent of total area patients who are male or female.

likely to be physically dependent because of their more advanced age.

4.3.3 Marital Status

Nonmarried persons (i.e., single, widowed, divorced, or separated persons) far outnumber married persons among admittees to nursing homes in both high-use and low-use areas. As illustrated in Table 12, however, this differential is greater in the large urban centres than in the rural areas.

The fact that fewer married than nonmarried people enter nursing home follows utilization experiences reported in the literature. This phenomenon offers an effective illustration of how social supports (i.e., a spouse) can enable people to postpone (or even avoid) nursing home admission (as suggested by Kahana & Coe, 1975). Individuals lacking this support appear more likely to be admitted to nursing home; for some, a socioeconomic need may be met with a health care solution. Whether or not the higher proportion of nonmarried patients being admitted in Edmonton and Calgary reflects an elderly population with a higher proportion of nonmarried individuals than in the rural areas cannot be determined from these data.[3] However, the well-known fact that more elderly women tend to be nonmarried than elderly men (since women tend to marry older men, as well as outlive men) plus the higher number of aged women in these cities suggest this may be so. The implication of this situation on nursing home utilization has been alluded to above.

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[3]The census tabulation by hospital district did not provide statistics regarding marital status. Although this problem could have been pursued using original Statistics Canada census files, the substantial time and resources required prevented further analyses from being undertaken in this thesis.

Table 12

Marital Status of Patients from

High-Use and Low-Use Areas

Area	Marital Status		Total Area Patients
	Nonmarried[a]	Married	
HIGH-USE			
-Edmonton & Calgary	2910 (81.1)[b]	679 (18.9)	3458 (100.0)
-Rural	1104 (75.0)	368 (25.0)	1472 (100.0)
LOW-USE			
-Rural	1225 (75.6)	396 (24.4)	1621 (100.0)
Alberta	5238 (78.4)	1443 (21.6)	6682 (100.0)

[a] Includes single, widowed, divorced, or separated patients.

[b] Numbers in parentheses indicate percent of total area's patients who are nonmarried or married.

4.3.4 Location Prior to Nursing Home Admission

Data regarding the location of patients prior to nursing home admission are summarized in Table 13. Overall, most patients are admitted from either private homes or general hospitals, although differences exist between high and low-use areas and between urban and rural areas. In Edmonton and Calgary (high-use areas), the highest proportion of patients enter nursing homes from private homes. This location is followed in importance by the general hospital, with all other locations accounting almost equally for the remaining 30 percent of patients. For rural high-use areas, the most common pre-admission locations are general hospitals and private homes (each accounting for about one-third of all patients), followed by auxiliary hospitals and lodges. Finally, for the low-use areas, private homes are secondary in importance to general hospitals, with a large number of patients also being admitted from auxiliary hospitals and lodges.

Regarding the above results, the overall importance of general hospitals and private homes as pre-admission locations agrees with results reported by Kane et al. (1976), Silberstein et al. (1970), and Zimmer (1975) in their studies of nursing home utilization. In addition, it is particularly interesting to note that the Manitoba Study (Manitoba Department of Health and Social Development, 1975), which focused on urban versus rural differences in nursing home (and other health resource) utilization, also found greater numbers of patients being admitted from private homes in urban centres than in rural areas.

In terms of possible explanations for the above findings, it is suggested that: 1) noninstitutional support services such as home care or geriatric day hospitals (likely available to a greater extent

Table 13

Location of Patients Prior to Nursing Home Admission

for High-Use and Low-Use Areas

Area	Location							Total Area Patients
	General Hospital	Auxiliary Hospital	Mental Hospital	Nursing Home	Lodge	Private Home	Other	
HIGH-USE								
-Edmonton & Calgary	996 (27.8)[a]	330 (9.2)	208 (7.6)	272 (7.6)	182 (5.1)	1492 (41.6)	105 (2.9)	3585 (100.0)
-Rural	491 (33.4)	174 (11.8)	107 (7.3)	59 (4.0)	110 (7.5)	484 (32.9)	43 (2.9)	1468 (100.0)
LOW-USE								
-Rural	509 (31.4)	268 (16.5)	101 (6.2)	81 (5.0)	152 (9.4)	474 (29.2)	35 (2.2)	1620 (100.0)
Alberta	1996 (29.9)	772 (11.6)	416 (6.2)	412 (6.2)	444 (6.6)	2450 (36.8)	183 (2.7)	6673[b] (100.0)

[a]Numbers in parentheses indicate percent of total area patients who are admitted from a particular location.

[b]Nine (9) missing values.

in the urban centres than in rural areas) may be helping a certain number of persons in Edmonton and Calgary to remain at home rather than being institutionalized prior to nursing home admission; 2) relatively high availability of general hospital beds, often with low occupancy rates, in rural areas may be contributing to their importance as locations prior to nursing home admission in rural areas; and 3) lower nursing home bed supply in the rural areas with low use rates may be contributing to the tendency for health care institutions to act as intermediate sources of care between the private home and the nursing home. Furthermore, this succession of care locations prior to nursing home entry may be responsible, at least to some extent, for the lower rates of institutionalization and older admission ages in the low-use areas (lending support to earlier speculations in this regard).

Comparisons of the locations of patients prior to nursing home admission by age group provides additional information regarding area variations in utilization. These results are summarized in Table 14 (more detailed tables are provided in Appendix B.6).

Referring to Table 14 and considering first the high-use areas of Edmonton and Calgary, it appears that patients entering nursing homes from private homes are older than other patients, with those admitted from extended care institutions being the youngest; specifically, 73.8 percent of patients from private homes are over age 75, compared to 69.3 percent from general hospitals and 58.0 percent from extended care institutions. These results seem logical given that patients already receiving care in a health care institution (as opposed to community living) may have experienced earlier and more pronounced dependency in relation to their health and social care needs

Table 14

Location of Patients Prior to Nursing Home Admission by Age Group for High-Use and Low-Use Areas

Prior Location	Age Group (in years) less than 65	65-74	75-84	85 or more	Total Patients
HIGH-USE AREAS -Edmonton & Calgary					
General Hospital	106 (10.6)[a]	200 (20.1)	417 (41.9)	273 (27.4)	996 (100.0)
Extended Care[b]	186 (18.8)	231 (23.3)	340 (34.3)	235 (23.7)	992 (100.0)
Private Home[c]	179 (11.2)	239 (14.9)	719 (45.0)	460 (28.8)	1597 (100.0)
-Rural					
General Hospital	45 (9.2)	100 (20.4)	217 (44.2)	129 (26.3	491 (100.0)
Extended Care[b]	103 (22.9)	110 (24.4)	139 (30.9)	98 (21.8)	450 (100.0)
Private Home[c]	62 (11.8)	101 (19.2)	218 (41.4)	146 (27.7)	527 (100.0)
LOW-USE AREAS -Rural					
General Hospital	30 (5.9)	103 (20.2)	209 (41.1)	167 (32.8)	509 (100.0)
Extended Care[b]	112 (18.6)	94 (15.6)	228 (37.9)	168 (27.9)	602 (100.0)
Private Home[c]	63 (12.4)	105 (20.6)	215 (42.2)	126 (24.8)	509 (100.0)

[a] Numbers in parentheses refer to percent of total patients from a particular location who are in a certain age group (i.e., % of row total).

[b] Includes auxiliary hospitals, mental hospitals, nursing homes, and lodges.

[c] Includes private homes and other locations.

than patients still living at home and, therefore, would be younger on nursing home admission.

Slightly different patterns of use exist in the rural high-use areas; in this case, 69.1 percent of patients admitted from private homes are over age 75, compared to 70.5 percent of patients from general hospitals and 52.7 percent from extended care institutions. Comparing these results to those for Edmonton and Calgary, it appears that rural admittees from private homes and extended care institutions are younger than their urban counterparts (age on admission from general hospital is similar). These differences are difficult to explain other than to suggest that they may be a consequence of fewer support services in rural areas resulting in earlier institutionalization, more lenient assessment and admission criteria, or greater availability of nursing home beds facilitating admission at younger ages.

In contrast to the above findings for the high-use areas, admission patterns in the low-use areas are characterized by higher proportions of older patients being admitted from general hospitals and extended care facilities and lower proportions of older patients being admitted from private homes. Specifically, 67.0 percent of patients admitted from private homes are over age 75, compared to 73.9 percent from general hospitals and 65.8 percent from extended care facilities. The fact that admittees from health care facilities are older than their counterparts in high-use areas suggests that these facilities may be serving as intermediate (or alternate) sources of long-term care to a greater extent in low-use than in high-use areas. At the same time, the fact that admittees from private homes are younger than patients in the high-use areas indicates that low nursing home use

rates are not necessarily associated with extended periods of community living.

Taken together, the above results regarding the location of patients prior to nursing home admission (i.e., both the overall admission patterns and the locations by age group) provide indirect evidence that general hospital and extended care facilities in low-use areas appear to be providing a certain amount of long-term care in lieu of nursing homes.

4.3.5 Summary

Findings from this analysis of selected nursing home patient characteristics may be summarized as follows:

1) Patients from areas with low rates of nursing home institutionalization are older on admission than are those from both urban and rural high-use areas.
2) Age-specific use rates for the moderately-old (75-84 years) and old-old (85+ years) are lower in the low-use areas than in the high-use areas.
3) Female patients outnumber male patients in both high and low-use areas, with Edmonton and Calgary having the highest proportion of female admittees.
4) Nonmarried patients far outnumber married patients in both high and low-use areas, with Edmonton and Calgary again having the highest proportion of nonmarried admittees.
5) Private homes and general hospitals are the most common prior locations for patients from high-use areas, whereas in low-use areas, private homes are secondary in importance to general

hospitals, with a large number of patients also being admitted to nursing homes from auxiliary hospitals and lodges.

6) Compared to the high-use areas, admission patterns in the low-use areas are characterized by higher proportions of patients over age 75 being admitted from general hospitals and extended care facilities and lower proportions of patients over 75 being admitted from private homes.

From the above results, it is obvious that variations do exist across the province not only in rates of institutionalization, but also in characteristics of the nursing home patients. A number of explanations have been provided for these differences in utilization patterns; overall, these explanations centre around possible differences in access to nursing home beds and possible variations in need for nursing home care due to differences in the health and/or social dependency status of area residents. However, given the older age of patients on admission and the observed tendency of general hospitals and extended care institutions to serve as intermediate sources of care between private homes and nursing homes in low-use areas, plus the fact that low-use areas also tend to have lower bed supplies, it appears that need for long-term institutional care may not be so different between high and low-use areas; rather, opportunities to express these needs in terms of nursing home admission may be fewer in the low-use than in the high-use areas.

In stating the above proposition, it is recognized that the observations in this study are based on data limited to nursing home bed availability and a few basic patient characteristics; other individual determinants of institutionalization which may influence expression of

need for nursing home care in terms of patient admission have not been considered. Examples of these latter factors include ethnic, cultural, and socioeconomic patient variables; availability and commitment of family and friends; availability of, and knowledge regarding, institutional and noninstitutional care alternatives; and admission policies of particular nursing homes. Studies of patients and the decision-making process leading to nursing home application and admission are urgently required to provide information regarding the influence of these additional patient characteristics on the observed regional variations in utilization patterns.

Following from the above results, one must also question the rigor and uniformity with which assessment and placement criteria are being applied across the province, the appropriateness of institutionalization both in nursing homes and in other health care facilities, the effectiveness of noninstitutional support services in postponing or preventing nursing home admission, and the degree of unmet need in areas of low utilization (i.e., are persons remaining in the community or other health care facilities rather than receiving nursing home care due to lack of beds, lack of knowledge regarding nursing home services, ineffective assessment and placement procedures, etc.). Answers to these questions are of utmost importance in planning for appropriate delivery of nursing home care; they will depend on research going beyond this beginning analysis of nursing home utilization to in-depth examinations of long-term care assessment and placement procedures, analyses of utilization practices for all types of institutional health care, and surveys of "at risk" elderly persons in the community. With respect to these suggested avenues of research, the

concepts of types of care classification (e.g., as developed by Bay et al., 1979) may find useful application by providing information regarding both the type of patients in health care institutions and the nature of care needs still unmet in the community.

Finally, the observation that rates of institutionalization increase markedly with increasing age supports the use of age-specific planning guidelines. The disproportionate increases in the number of persons in the 75-84 and 85+ age groups which are projected for the next 20 to 40 years lend credence to this method of forecasting future nursing home bed requirements.

4.4 Overall Summarizing Remarks

The major findings from this beginning analysis of geographic perspectives in nursing home utilization may be summarized as follows:

1) Nursing home utilization appears to be primarily a local phenomenon, with the availability of nursing home beds being a major factor influencing patient origin-to-nursing home flow patterns. Specifically, patients tend to seek care in their areas of origin if nursing home beds are available; nursing homes tend to serve a relatively local population, with bed availability being instrumental in determining the degree of local versus non-local utilization.
2) Preliminary evidence suggests that nursing home characteristics (e.g., size, ownership, accreditation status) may influence, at least to some extent, patient origin-to-nursing flow patterns.
3) Variations exist in both per capita bed supply and rates of institutionalization across the province, with most areas having

high bed supply also experiencing higher rates of institutionalization.

4) Variations exist in utilization patterns between areas with high and low rates of institutionalization: Compared to patients from high-use areas, nursing home patients from low-use areas are older and more likely to be admitted from general hospitals and extended care institutions and less likely to be admitted from private homes.

5) Variations exist in utilization patterns between rural and urban areas: Compared to patients from rural areas, nuring home patients from urban areas are more likely to be female, nonmarried, and admitted to nursing home from private homes.

Possible reasons for these differences in patterns of nursing home utilization and their implications for planning have been presented.

Apart from these geographic perspectives in utilization, a very definite finding was that the likelihood of nursing home admission increases markedly with increasing age, with the largest increase in admission rates occurring between the ages of 75 and 85.

Recognition of the preliminary nature of these study findings has been given throughout the presentation and discussion of results; this has been done not only to stress the need to interpret these results appropriately, but also to highlight areas where further research is required to clarify reasons underlying the observed regional variations in nursing home utilization patterns. Following from this last remark, the next chapter contains a proposal for a patient survey designed to complement the findings of the present study.

CHAPTER V

PROPOSAL FOR A NURSING HOME PATIENT SURVEY

In this chapter, the investigator provides an outline for a patient survey designed to extend the present analysis of nursing home utilization by focusing on patients' reasons for seeking nursing home care, their motives for choosing particular care locations, and the appropriateness of their placement (as indicated by their type of care classification). Included in this proposal are discussions of the 1) statement and importance of the problem, 2) significance of the study, 3) objectives and research approach, and 4) methodology. It is recognized that the research objectives, design, and methodology may be modified by the researcher(s) undertaking the study. For this reason, only a general outline of the proposed survey is provided, the purpose being to facilitate the efforts of any interested party in developing, and securing adequate resources for, such a research project.

5.1 Statement and Importance of the Problem

The analysis of geographic perspectives in nursing home utilization carried out in this thesis has provided preliminary information regarding nursing home care-seeking behaviors and regional variations in utilization patterns. However, central to a complete understanding of the observed patterns of utilization are three aspects of utilization which were beyond the scope of, and data available for, the present patient origin-destination study. These three areas of concern are as follows:

1) Patients' reasons for seeking nursing home care. (e.g., what was

the role, or relative importance, of medical, social, psychological, and economic factors in contributing to need for nursing home care?)

2) Patients' motives for choosing particular care locations. (e.g., what was the role, or relative importance, of nursing home size, ownership, location, ethnic or religious affiliation, reputation for care, etc., in influencing choice of care location; and who (e.g., patient, family, physician) was involved in the decision-making process?)

3) The appropriateness of nursing home utilization. (e.g., was nursing home placement, considered in relation to the concepts of types of care classification, appropriate?)

The above questions would be the major points of investigation in the proposed nursing home patient survey. As such, this study would consider the second aspect of the conceptual model for nursing home utilization which was developed for this thesis, namely the influences of individual determinants of institutionalization (i.e., characteristics of the elderly person, family support systems, and the health and social service system) on nursing home utilization. Information regarding these aspects of utilization not only would clarify certain patterns of use observed in the present study, but also would provide additional information regarding nursing home care-seeking behaviors. For these reasons, investigation of these patient aspects of nursing home utilization is considered to be a worthy research effort.

5.2 Significance of the Study

Studies which attempt to clarify patients' decision-making processes prior to institutionalization have the potential to identify problems

and gaps in the health care system, both within the institutional component and in the community. Secondly, by focusing on the health and social care needs which influence patient admission to nursing home, these studies have the potential to identify the stage at which the ability to live independently declines significantly. Third, by considering patients' reasons for applying to specific institutions, these studies have the potential to indicate the relative importance of such factors as a nursing home's location, physical facilities, or care programs on patient origin-to-nursing home flow patterns. Finally, if an evaluation of the appropriateness of nursing home placement is included, it is possible to obtain an indication of both the effectiveness of assessment and placement procedures and the degree of appropriate/inappropriate utilization (the latter information being useful in estimating true need for nursing home care and the corresponding level of adequate bed supply).

The above information and action implications arising from the results have definite relevance to future nursing home policies and planning (as illustrated in the research design in Chapter III). In addition, there is a need to learn more about patients' care-seeking behaviors as they relate to nursing home care. Most studies in this regard have considered only urban nursing home patients (e.g., Kraus et al., 1976(a) and 1976(b)) or very specific aspects of the decision-making process (e.g., family support systems, as in Karcher and Linden (1974) or Berenson (1977); ethnicity, as in Fandetti and Gelfand (1976) or Eribes and Bradley-Rawls (1978)). In contrast, the proposed patient survey would attempt to consider patients' care needs, the application process, and the appropriateness of nursing home placement, as well as

possible differences between urban and rural settings in these aspects of nursing home utilization. In this way, this study would provide information relevant not only to planning nursing home services in the province, but also to the theory of patients' care-seeking behaviors in the nursing home system.

5.3 Objectives and Research Approach

Following from the above discussions of the research problems and the significance of the project, the objectives may be stated as follows:

1) to identify factors relating to a patient's health and social dependency status which contributed to his/her need for nursing home care;
2) to identify factors which influenced a patient's choice of care location; and
3) to examine the appropriateness of a patient's placement in the nursing home (as indicated by his/her type-of-care classification).

In approaching these objectives, emphasis should be placed on describing the overall situation with respect to each of these points, as well as relating the information regarding needs, choices, and appropriateness of use to relevant patient demographic characteristics (e.g., age, sex) and to patient origin (e.g., urban versus rural patient locations).

5.4 Methodology

This section provides a general outline of the methodology for the proposed study. Areas discussed include the research design and patient sample, data collection and analysis procedures, and factors to be

considered in study implementation.

5.4.1 Research Design and Patient Sample

In contrast to the present study which relied upon administrative data, the proposed study would adopt survey research methods and would use primary data obtained from the patients themselves, family members, and associated health care professionals. In selecting the nursing home patients, it is suggested that the following three criteria be considered: First, since the desired information concerns the decision-making process related to nursing home admission and the appropriateness of initial placement, the patients should be fairly recent admissions (e.g., within the past six to twelve months) in view of memory factors and changes in patients' care needs over time. Second, since information is desired regarding the relationship of these various patient-related factors to patient origin in urban versus rural settings, consideration should be given to ensuring adequate representation of patients from both of these areas. Third, since inclusion of all recently admitted patients throughout the province would be beyond the time-frame and resources of most researchers, a sample survey would be necessary.

The above criteria suggest the need for a stratified two-stage probability sampling design; the first stage would be the selection of nursing homes (to limit the territory of the survey, as opposed to randomly selecting patients from throughout the province), and the second stage would be selection of patients within the sampled facilities. In preparation for the first-stage sample selection, nursing homes would be sorted into four location strata: nursing homes

in large urban centres (i.e., those in Edmonton and Calgary); nursing homes adjacent to these large urban centres; nursing homes in smaller urban centres (i.e., those in Red Deer, Lethbridge, and Medicine Hat); and nursing homes in rural Alberta (i.e., all other facilities). Neyman's allocation formula could be used to determine the number of patients to be selected from each stratum. Nursing homes (serving as clusters of patients) could then be randomly selected from each stratum in proportion to nursing home size (equivalent to cluster sampling); alternatively, controlled selection techniques (as described by Hess, Riedel, & Fitzpatrick, 1975, pp. 18-20) could be used to control for additional factors such as private versus public ownership.

The second-stage selection of patients would require a list of all recently admitted patients in each of the sample facilities. This list (the sampling frame) could be obtained by contacting each of the selected nursing homes and requesting the names of all patients admitted within the last six (or twelve) months; however, to avoid selection bias, it would be better to obtain a list of all patients (as of a fixed date) and then reject those who were admitted beyond the desired time period. Patients would then be randomly selected from the selected nursing homes in each of the location strata to result in the final sample of nursing home patients. When deciding the number of patients to be chosen, consideration should be given to potential loss of patients from the sample due to death or refusal to participate in the study. As a final step in the design, whenever practical and economical, interviewers/assessors should be randomly assigned to the particular nursing homes and the patients within each facility who had been

selected for the study.

As Hess et al. (1975, pp. 9-15) and Raj (1972) have pointed out, a stratified sampling technique has three important advantages: 1) it may permit greater precision in estimating population characteristics if the variables of interest are related to the stratification variables; 2) it enables different selection procedures to be used within the various strata; and 3) it allows estimates to be made for each subpopulation/stratum separately, as well as for the entire population. Random assignment of interviewers to nursing homes represents an attempt to control for extraneous variables which might be introduced by different interviewers (one aspect of internal validity, as discussed by Campbell & Stanley, 1966, pp. 5-16). Finally, probability selection of both nursing homes and patients represents an attempt to increase the generalizability of the results to recently admitted patients in the present nursing home system (a major factor related to the external validity of the study, as discussed by Bracht and Glass (1968) and Hess et al. (1975, pp. 8-10)).

5.4.2 Data Collection and Analysis Procedures

The desired patient information would be collected in four ways: 1) patients' charts would be reviewed to obtain information regarding patients' health status and care requirements; 2) patient interviews would be conducted to obtain information regarding patients' reasons for seeking nursing home care and for choosing particular care locations; 3) for some patients, interviews with family members would possibly be necessary to obtain the desired patient information; and 4) patient assessment and classification, according to the five types

of care, would be carried out.

With respect to the use of patient interviews as the basic data collection procedure, self-administered questionnaires offer an alternative method of obtaining patient information; however, in this study and for reasons which follow, questionnaires are deemed less suitable than patient interviews. First, the majority of nursing home patients are over age 75 on admission and therefore may have diminished eyesight or reduced hand coordination, both of which would make completing a questionnaire difficult. Second, by interviewing the patient, the interviewer would be able to judge the patient's comprehension of the questions and general ability to answer correctly. Third, during the interview, the interviewer would be able to assess the patient's overall level of functioning, one aspect to be considered in determining the appropriateness of patient placement.

The following information should be obtained for each patient:

1) Basic Demographic Data (from the patient's chart)

- age on admission
- sex
- marital status on admission
- ethnic origin
- home address
- location prior to nursing home admission

2) Data Regarding the Application Process (from the interview)

- reasons for admission (e.g., in relation to health or social factors, access to alternative institutional or noninstitutional care alternatives)
- persons involved in the application process (e.g., patient, family, physician, others)
- length of waiting period prior to admission
- reasons for choosing particular care location (e.g., in relation to location of the nursing home, facility characteristics such as physical plant, staffing, care programs, religious or ethnic affiliations)

3) Patient Classification by Types of Care (based on patient assessment which should be combined with chart review and patient interviews). It is suggested that with certain revisions to reflect the special needs of this survey, the assessment/classification/placement form developed by Bay et al. (1979) could be used to assimilate the following information regarding patient's health status and care needs:

- chronic conditions and physical impairments
- level of independent functioning (e.g., in terms of activities of daily living)
- physical and psycho-social care requirements

Regarding the last step in data collection, the scope of this proposal does not permit a review of various methods of patient assessment and classification (they have been well reviewed by Bay et al. (1979) in their study on patient classification by types of care). However, it is important to note that this approach to providing information regarding the appropriateness of patient placement results in data relating to the distribution of nursing home patients by types of care, rather than in singular judgements of "appropriate" or "inappropriate" placement. Placement is patient specific and often depends on a compromise between environmental constraints (e.g., availability of institutional or noninstitutional care alternatives) and a patient's level of physical and psycho-social functioning (as assessed by the type of care classification). Furthermore, the parameters defining appropriate or inappropriate placement are often difficult to specify and apply consistently since they are subject to value judgements. Finally, a study focusing on appropriate and inappropriate placement may be threatening to some nursing home operators, thereby creating

potential problems in enlisting their cooperation and possibly distorting the results. For these reasons, it is felt that distributions of patients by type of care would provide the most useful information regarding the nature of patients being admitted to nursing homes. If it were then assumed, for example, that Type II patients should be in nursing homes, an indication of the overall degree of appropriate versus inappropriate utilization could be obtained.

Data analysis would involve describing patients' reasons for seeking nursing home care and choosing particular care locations, their health status and care needs, and their distribution by types of care, as well as determining the relationships between these findings and various patient demographic factors and patient origin.

In collecting and analyzing the above data, the purpose of the study would not be to evaluate each patient or nursing home; rather, all data would be tabulated and interpreted at the provincial level only. Assurance regarding confidentiality would be an important factor in obtaining cooperation from both nursing homes and patients. This also suggests that it would be more desirable for such a study to be conducted by a neutral agency (e.g., a reputable consulting firm or university) rather than by the government, the funding and controlling body for nursing home care.

5.4.3 Implementation Plan

Factors to be considered in implementing this study may be summarized as follows:

1) Study Preparation

This phase would involve preparation of the detailed study proposal

(including final study objectives, literature review, detailed design and methodology, and survey instrument design); investigation of legal implications involved with patient interviews and chart reviews; selection of the nursing homes, followed by letters of introduction to each nursing home requesting a list of all their patients (the list should include patient's name and admission date); development and pretesting of the data collection instrument and interview guide; and training of the interviewers.

2) Data Collection

This phase would include patient selection, followed by letters of introduction to patients and the actual patient interviews and data collection.

3) Data Analysis

This final phase would involve analysis of the results, followed by report write-up.

As outlined above, this project would require approximately fifteen to eighteen months for completion: six months for each of phases 1 and 2 and three to six months for phase 3. Typical staff requirements would include a project director, research assistant, part-time secretary, and interviewers for the period of data collection. The interviewers would ideally be nurses due to the need to assess and classify patients. During the patient assessment and classification steps, the interviewers could also be assisted by a consulting physician and social worker. Staff costs would account for the largest portion of the budget, with the remaining expenses involving mainly computer costs, travelling, and general supplies and services.

The time-span, staff requirements, and budget will depend on the

researcher's final decisions regarding the objectives and scope of the project. Nonetheless, the foregoing description does indicate the factors which must be considered, and as such, should facilitate the efforts of researchers in developing and securing adequate resources for such a project.

5.5 Summary

This chapter provides an outline for a patient survey designed to determine patients' reasons for seeking nursing home care, their motives for choosing particular care locations, and the appropriateness of nursing home placement as indicated by type-of-care classifications. Such information would complement the findings from the present patient origin-destination study, as well as provide additional information relevant to nursing home policies and planning. Beginning descriptions of a possible design, data collection procedure, and implementation plan are provided to assist any interested party in undertaking such a nursing home patient survey.

CHAPTER VI

SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

6.1 Summary of the Study

Following from the Medicus Canada Report (1978) which provided preliminary evidence that nursing home beds were not distributed equitably throughout the province of Alberta, this study was undertaken to answer several broad, basic questions concerning nursing home utilization patterns and their relationships to the distribution of nursing home beds.

To place this study into perspective with respect to the available literature, it may be said that although the literature on nursing home utilization was abundant (both in relation to determinants of institutionalization and selected aspects of utilization) little information was available regarding geographic perspectives in utilization. This was especially true concerning relationships of patients' care-seeking behaviors to availability of nursing home beds and regional differences in utilization patterns. Furthermore, considering patient origin-destination studies, they had seldom been used in analyses of nursing home utilization, although their utility in studies of hospital utilization was well-documented. In view of these observations, this study was designed to provide information which would be relevant not only to the above research objectives and nursing home planning activities, but also to a better understanding of patients' care-seeking behaviors as evidenced by patient origin-to-nursing home flow patterns and related regional analyses of utilization patterns.

Patient origin-destination study techniques, using administrative data obtained from the admission records of all Alberta residents in nursing homes as of December 31, 1976, formed the methodological basis for this research. By considering where the patient came from and where the patient went to receive care, it was possible to examine 1) patient origin-to-nursing home flow patterns; 2) regional variations in per capita bed supply and utilization (based on the NHA's of patient origin); 3) relationships between nursing home area (NHA) and facility characteristics and resulting patient flow patterns; and 4) variations in patient characteristics between areas of high versus low rates of nursing home utilization (based on aggregates of the appropriate NHA's of patient origin). Due to data limitations and the exploratory nature of the study, no confirmatory data analyses such as statistical inference were attempted; rather, data analysis was limited to using descriptive statistics plus rank correlation and multiple regression analyses to describe the above aspects of nursing home utilization.

In relying exclusively on administrative data for this study, information regarding patients' reasons for seeking nursing home care or choosing particular care locations - information relevant to these geographic perspectives in utilization - was not available. In recognition of this limitation, a proposal for a patient survey suitable for obtaining this information was outlined.

Throughout the study, emphasis was placed on providing information which would be useful in both short-term and long-term planning of nursing home services.

6.2 Findings and Conclusions

Major findings from this beginning analysis of geographic perspectives in nursing home utilization may be summarized as follows:

1) Nursing home utilization appears to be primarily a local phenomenon, with the availability of nursing home beds being a major factor influencing patient origin-to-nursing home flow patterns.
2) Preliminary evidence exists that characteristics of nursing homes (e.g., ownership, size, and accreditation status) appear to influence patient origin-destination patterns.
3) Variations exist in both per capita bed supply and rates of institutionalization across the province, with most areas having high bed supply also experiencing higher rates of institutionalization.
4) Compared to patients from high-use areas, nursing home patients from low-use areas are older and more likely to be admitted from general hospitals and extended care institutions and less likely to be admitted from private homes.
5) Compared to patients in rural areas, nursing home patients in the large urban centres of Edmonton and Calgary (accounting for over one-half of all patients) are more likely to be female, non-married, and admitted to nursing homes from private homes.

Based on these findings, three tentative conclusions may be made; the conclusions are considered tentative because this study was limited in the data available for analysis and interpretation, hence all relevant determinants of institutionalization have not been considered. These conclusions are as follows:

1) With reference to the original research problem, nursing home bed supply does appear to influence utilization patterns: Specifically, when compared to areas with high bed supply, areas with low bed supply appear to experience greater patient outflow for nursing home care; have lower rates of nursing home use; and have patients who are older on admission and more likely to be admitted from general hospitals, auxiliary hospitals, and lodges. The latter two observations suggest that low-bed areas may be associated with a backlog of long-term care patients in the rest of the institutional health care system.

2) Patterns of nursing home utilization (at least in terms of patients' sex, marital status, and prior location) appear to differ between urban and rural settings.

3) Since characteristics of nursing home facilities appear to influence, at least to some extent, patient origin-destination patterns, nursing homes should not be considered as homogeneous or generic facilities; rather, they should be seen as having different attributes which may influence resulting utilization patterns.

Taken together, these conclusions regarding geographic parameters and variations in patients' care-seeking behaviors bring into focus the central point in this thesis: Planners must think more broadly than merely counting the number of beds in a specific geographic area; in making decisions regarding supply and distribution of nursing home beds, they must also consider the specific characteristics of nursing homes in an area, the nature of persons being served, and the flow of patients through the overall health care system. In essence, planning

must be considered from a total health care system's perspective.

Apart from the above conclusions with respect to geographic perspectives in utilization, the observation that rates of institutionalization increase markedly with increasing age supports the use of age-specific planning guidelines in estimating requirements for nursing home beds. Related to this statement is the fact that the information conveyed by per capita nursing home resource or utilization measures depends on the population figures used in the denominator. For meaningful, hence useful, results in regional comparisons of these ratios, attempts should be made to correct for age disparities in area populations. Depending on the degree of refinement required, per capita ratios based either on the number of persons age 65 or over or on age-sex adjusted area populations should be used.

Finally, based on the experiences in this study, the patient origin-destination approach appears to provide a useful methodology in analyzing nursing home utilization; it has utility both in outlining patient origin-to-nursing flow patterns (data being quantified using relevance/commitment indices) and in providing a basis for examining regional variations in utilization patterns (areas for comparison being based on the areas of patient origin). Furthermore, the fact that the administrative data used in this study are representative of routinely collected statistics suggests that potential exists for using patient origin-destination techniques in periodic analyses of nursing home utilization patterns.

6.3 Recommendations

Based on the findings and conclusions from this study, the

following recommendations are offered for consideration by health planners, policy makers, and researchers:

1) Attempts should be made to bring nursing homes as close to patients' own homes and communities as is feasible from both economic and quality-of-service viewpoints: not only would this allow patients to remain in or near their areas of origin for care; but also, it would provide greater opportunity to design facilities and programs which would reflect more closely the customs and characteristics of local communities. This could be achieved by planning on a sub-regional basis whereby several small and adjacent communities would be served by one nursing home, with that facility being of sufficient size to function economically and support the necessary range of patient services and care programs.

2) Planning guidelines for provision of nursing home beds should be based on the following four age groups, namely persons below age 65, age 65-74, age 75-84, and age 85+. If it is assumed that rates of nursing home utilization aggregated at the provincial level approximate need for nursing home care, these overall rates of utilization (expressed as the number of nursing home patients per 1000 persons in a specific age group) could form the basis for these planning guidelines in the absence of more definitive information regarding need.

3) Further to the above, the impact of age differences on nursing home utilization indicates that when regional comparisons of per capita bed supply or use rates are to be made, efforts should be made to correct for age and sex disparities among area

populations: For maximal refinement (indicated in health care research), age-sex adjusted population should be used; for routine planning activities, expressions of bed supply or use rates based on the number of persons age 65 or over appear to be satisfactory.

4) Although not the specific subject of this study, it has become clear that senior citizen's lodges in Alberta are providing a significant amount of care to elderly persons (especially in rural areas) and are acting as frequent "entry points" into the institutional system of long-term care. For these reasons, it is recommended that the advisability and feasibility of including these facilities within Alberta's health care system be investigated.

5) In order to verify and extend the findings from the present study, steps should be taken to carry out a patient survey focusing on patients' reasons for seeking nursing home care, their motives for choosing particular care locations, and the appropriateness of nursing home utilization (as indicated by standardized assessment and classification data). The research proposal provided in Chapter V should be of assistance in this regard.

6) Finally, in order to provide additional information relevant to nursing home policies and planning, it is recommended that further research be undertaken in the following areas:

   i) periodic patient origin-destination studies, in order to identify changes in patient flow and utilization patterns over time;

   ii) surveys of "at-risk" persons in the community (e.g., persons over age 70, elderly persons living alone and/or in poor health, residents in lodges, those on waiting lists, etc),

in order to determine the extent of unmet or potential need for nursing home care;

iii) studies of rural-to-urban migration patterns of the elderly, in order to provide information regarding the nature and extent of this movement and its potential influence on nursing home bed distribution and utilization; and

iv) surveys of the "well" and "independent" elderly (the great majority of people who never enter nursing homes), in order to identify factors which enable these people to remain outside the institutional system of care. These factors might then suggest policy implications for "preventive" health activities which could complement the institutional system of long-term care.

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APPENDIX A: SUPPLEMENTS TO THE METHODOLOGY

A.1 Patient Admission and Assessment Form (HS 021-082)

A.2 Nursing Homes Included in the Study

A.3 Background Paper. Geographic Divisions in the Province of Alberta: Their Utility in Patient Origin-Destination Studies

Appendix A.1

Alberta

HS 021 - 082

ASSESSMENT AND ADMISSION FORM

HOSPITALS AND MEDICAL CARE

HOSPITAL SERVICES

NOTE: For instructions on submission of this application, see reverse side of last page.

Section I. SECTION I TO BE COMPLETED BY RECEIVING INSTITUTION ONLY

Admitted to: (Name of Institution) _____

Date _____ Case No. _____

Section II. Applicant's Name _____ Sex _____ Marital Status _____

Date of Birth _____ Age _____ Religion _____

A.H.C.I.C. No. _____ Blue Cross No. _____

Applicant's Home Address _____ Phone _____

Present location of Applicant _____

Last Active Treatment Hospital _____ Date _____

Next of Kin (or responsible person) _____ Relationship _____

Address _____ Phone _____

Section III. Statement of Residence

If applicant claims entitlement to benefits under The Nursing Homes Act, he must provide below the details of his residence in Alberta either for the 3 consecutive years immediately preceding his application or for the 10 consecutive years at any time preceding his application.

Address _____ Dates _____

Address _____ Dates _____

Address _____ Dates _____

Address _____ Dates _____

Address _____ Dates _____

Name of person (other than a relative of the patient) with whom residency can be verified:

_____
Name and Address

_____ _____
Witnessed by Member of Nursing Home Staff Patient or Patient's Agent

_____
Relationship to Patient

Section IV. Medical Assessment Committee

Approved for admission to – Auxiliary Hospital ☐

Nursing Home ☐

Senior Citizens' Home ☐

Other (specify) _____

(For definitions see reverse side of pages 1(b) and 2.)

_____ _____
Date Chairman, Medical Assessment Committee

(Formerly AHSC 290)

A.2 Nursing Homes Included in This Study

Location	Name[a]	Ownership	Rated Bed Capacity
Athabasca	Parkland	Private[b]	50
Barrhead	Barrhead	District	52
Blairmore	Crowsnest Pass	District	30
Bonnyville	Parkland	Private	50
Brooks	Newell	District	50
Calgary	Beverly	Private	144
Calgary	Parkland	Private	96
Calgary	Bow-Crest	Private	150
Calgary	Bow View	Private	154
Calgary	Brentwood	Private	120
Calgary	Cedars Villa	Private	248
Calgary	*Central Park Lodge	Private	123
Calgary	Chinook	Private	149
Calgary	Father Lacombe	Religious	104
Calgary	Forest Grove	Private	150
Calgary	*George Boyack	District	222
Calgary	Glamorgan	Private	55
Calgary	Mayfair	Private	142
Calgary	*Sarcee	District	75
Calgary	Scottish	Private	46
Calgary	Southwood	Private	120
Camrose	*Bethany	Religious	100
Cardston	Grandview	District	40
Coronation	*Coronation-Paintearth	District	33
Didsbury	*Mountain View-Kneehill	District	40
Drumheller	*Dr. T.R. Ross Memorial	District	80
Edmonton	*Dr. Angus McGugan	District	225
Edmonton	*Central Park Lodge	Private	134
Edmonton	*Good Samaritan Mount Pleasant	Religious	196
Edmonton	*Good Samaritan Southgate	Religious	224
Edmonton	Hardisty	Private	226
Edmonton	Parkland South	Private	95
Edmonton	*Jasper Place Central Park Lodge	Private	100
Edmonton	Jubilee Lodge	Private	128
Edmonton	Parkland North	Private	120
Edmonton	Venta	Private	65
Edmonton	Veteran's Home (DVA)	Federal	150
Fairview	Fairview	District	40
Fort Macleod	Parkland	Private	50
Fort Saskatchewan	Rivercrest Lodge	Private	70
Grande Prairie	Central Park Lodge	Private	88

../Continued

Location	Name	Ownership	Rated Bed Capacity
Grande Prairie	*Swan Haven	District	50
Hanna	*Palliser	District	50
High Prairie	*J.B. Wood	District	52
High River	Twilight	District	34
Lacombe	Lacombe	District	52
Lamont	Lamont	District	31
Leduc	Parkland	Private	79
Lethbridge	Parkland	Private	59
Lethbridge	Edith Cavell	Private	100
Lethbridge	*Southland	District	150
Linden	Linden	Religious	37
Lloydminster	Dr. Cooke	District	75
McLennan	Our Lady of the Lake	Religious	50
Mayerthorpe	Parkland	Private	50
Medicine Hat	River View	Private	130
Medicine Hat	Sunnyside	Religious	100
Peace River	*Sutherland	District	76
Ponoka	Northcott Lodge	Private	70
Provost	Provost and District	District	50
Red Deer	Red Deer	District	118
Red Deer	Valley Park Manor	District	100
Red Deer	West Park	District	70
St. Albert	*Youville	Religious	162
St. Paul	Parkland	Private	75
Sherwood Park	*Sherwood Park	Religious	100
Smoky Lake	Smoky Lake	District	33
Stettler	Stettler	District	50
Stony Plain	*Good Samaritan	Religious	90
Two Hills	*Eagleview	District	30
Vegreville	*Vegreville	District	40
Vermilion	Alice Keith	District	50
Viking	Parkland	Private	64
Vulcan	Parkland	Private	36
Westlock	Westlock	District	52
Wetaskiwin	Wetaskiwin	District	50
			6950

[a]Asterisk(*) beside the nursing home name indicates that the facility is accredited by the Canadian Council on Hospital Accreditation.

[b]Those facilities owned and operated by the local hospital and/or nursing home district.

A.3 Background Paper

GEOGRAPHIC DIVISIONS IN THE PROVINCE OF ALBERTA: THEIR UTILITY IN PATIENT ORIGIN-DESTINATION STUDIES[1]

A Paper Prepared as Background
for the thesis,
Nursing Home Bed Utilization in Alberta:
A Patient Origin-Destination Study

by
S. Marlene Raasok
Division of Health Services Administration

Summer, 1979

Health care research or planning activities which attempt to analyze patterns of service utilization through patient origin-destination studies require a geographic area or point of patient origin. The purpose of this background paper is to examine various geographic divisions available in the province of Alberta in terms of 1) their general applicability in patient origin-destination studies as well as other health care studies, and 2) the choice of geographic unit used in this thesis.

The requirements of the area/point of patient origin vary depending on the purpose of the study. For example, if the purpose of the patient origin-destination study is simply to examine patterns of patient travel to a single care facility, a very small area or a single point (e.g., town) may be satisfactory; if the patient origin data are to be used in determining service areas and corresponding service populations, relatively larger geographic areas which may serve as building blocks in service area definition and for which population data are available will be necessary; or if the intent is to examine relationships of patient origin-destination patterns to factors such as demographic characteristics, rates of health care use, or levels of resource availability, one must ensure that the desired demographic and health care data are available according to the areas of patient origin. In addition, the area of origin must not be so small that data analysis becomes unmanageable and utilization estimates become unstable or so large that relevant patterns of utilization become obscured (e.g., the latter problem could occur if several health facilities were located in a large area). Also, if the intent is to consider utilization on a province-wide basis, the areas of patient origin should divide the province into

mutually exclusive and exhaustive areas so that all parts of the province and all persons may be included, and they should have obvious relevance to provincial planning. These general considerations in selecting an area of patient origin are illustrated in the following descriptions of various geographic divisions available in the province of Alberta.

Geographic Divisions in Alberta

The following methods for dividing the province into geographic areas are considered: 1) geographic coordinates (ranges, townships, and meridians); 2) federally-approved areas such as postal code areas and census boundaries; and 3) provincially-approved areas such as municipalities, health units, and general hospital, auxiliary hospital and nursing home districts. Although other geographic areas may be present in the province (e.g., regional planning areas), the above approaches represent the major official divisions useful for health care research and planning. Each of the areas is considered in relation to its function, characteristics (e.g., number, size, method of formation or alteration), and utility as a geographic unit of patient origin in health care studies.

Geographic Coordinates

Standard geographic coordinates include meridians, ranges, and townships. These measures serve as basic units of geography in map construction and land surveying. Meridians refer to lines of longitude. These lines run north and south but are not parallel because they originate and terminate at the poles. (Longitude is measured in terms of distance east or west of the prime meridian of Greenwich, England).

As illustrated in Figure I, the Alberta-Saskatchewan border is on the fourth meridian, with fifth and sixth meridians also running through the province as one goes west from the Saskatchewan border. Ranges refer to a series of divisions numbered west from each meridian. They are indicated by the horizontal numbers extending from one meridian to another (see Figure I). Each range consists of townships, each six miles square (36 sections), that are numbered north from a base line. Townships are indicated by the series of numbers starting at the Alberta-Montana border and going north along the Alberta-Saskatchewan border. The base line for the townships is the 49^{o} of latitude (latitude being measured in terms of degrees north or south from the equator).

When townships, ranges, and meridians are considered together, it is possible to identify exact locations on a map. The geographic code used by the Department of Hospitals and Medical Care for designating patients' home communities is based on this principle. For example, a geocode of "003425" specifies township 003, west of the 4th meridian and range 25--the location being Cardston; similarly, a geocode of "083521" specifies township 083, west of the 5th meridian and range 21 --the location being Peace River.

This method of documenting a person's home community provides much precision in determining patient origins (i.e., patient origin is designated by a single point). However, this detail must be weighed against the problem of "information overload" in large-scale studies of patient origin-destination patterns. For this reason, utility of the geocode based on these three geographic coordinates in patient origin studies is likely to be very limited, though one exception to this statement may be its use in small-scale studies, such as on a single-

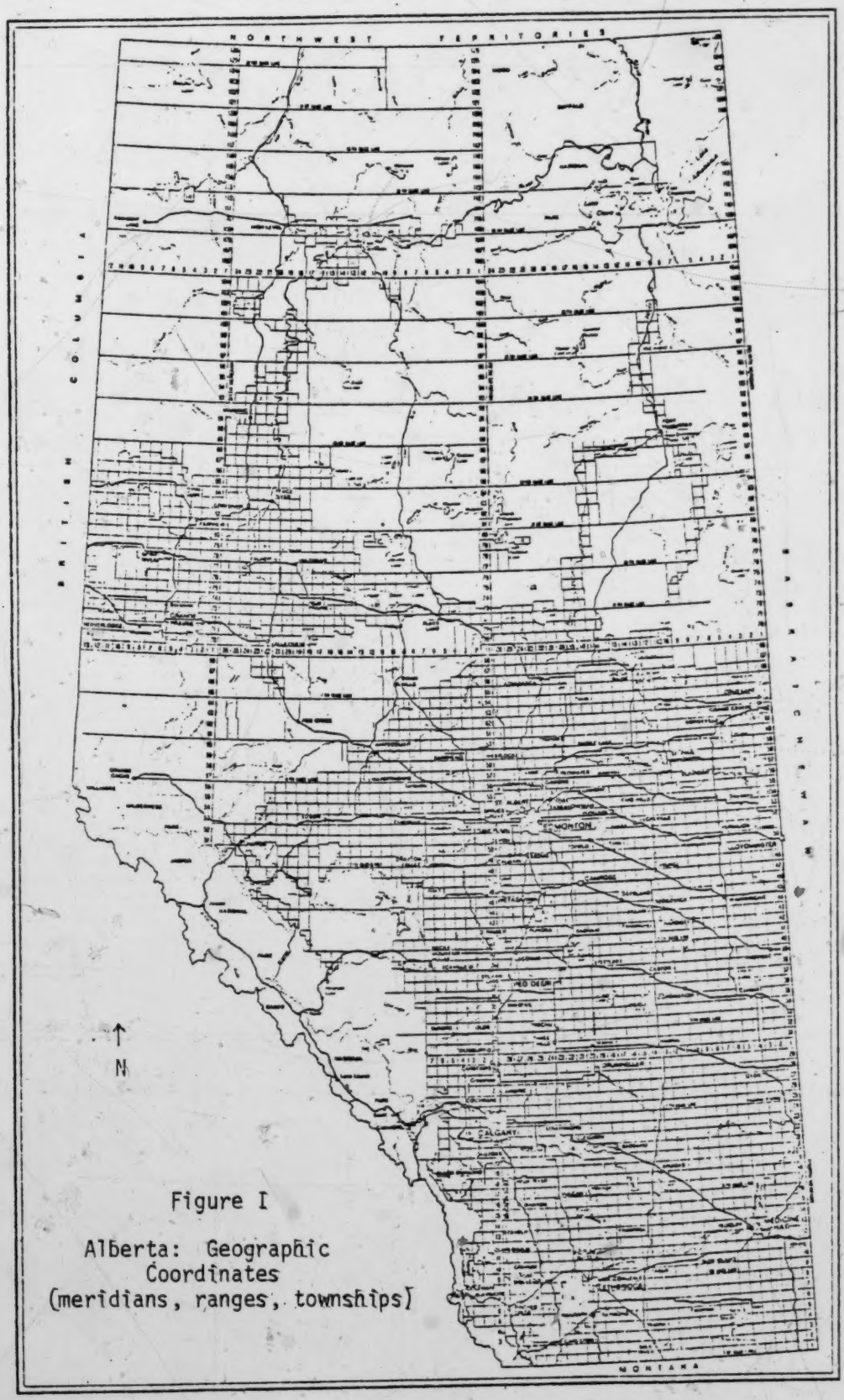


Figure I

Alberta: Geographic Coordinates (meridians, ranges, townships)

institution basis, where the number of cases are fewer and where the detail provided by the geocode may be of definite value.

Postal Codes and Areas

The postal code is a permanent part of each person's postal address and has been designed by the Canadian Post Office as a means of expediting mail transfer and delivery through the use of mechanized sorting methods. The six-digit code is composed of both letters and numbers in the form of ANA NAN, where A represents a letter of the alphabet and N a number. The first three characters represent the Area Code and the last three a specific address.

In Alberta (where all codes begin with "T"), there are ten rural postal code areas as illustrated in Figure II. Within each rural area, the last three digits in the code indicate a specific post office. Rural routes and post office boxes are given the same code as the post office from which the routes originate or where the boxes are located. In Edmonton and Calgary, the Area Code describes an area approximately the size of 25 letter carrier routes (see Figures III and IV). Within each area, the last three characters denote a very small and easily-defined section, and they have the capability to specify one side of a city block, an apartment or office building, a large firm or organization which does considerable business with the post office, or service from a post office or postal station (e.g., rural route or general delivery).

Since the postal code is a permanent part of a person's address, it has obvious potential appeal as an identifier of patient origin in health care utilization studies. When the complete six-digit code is

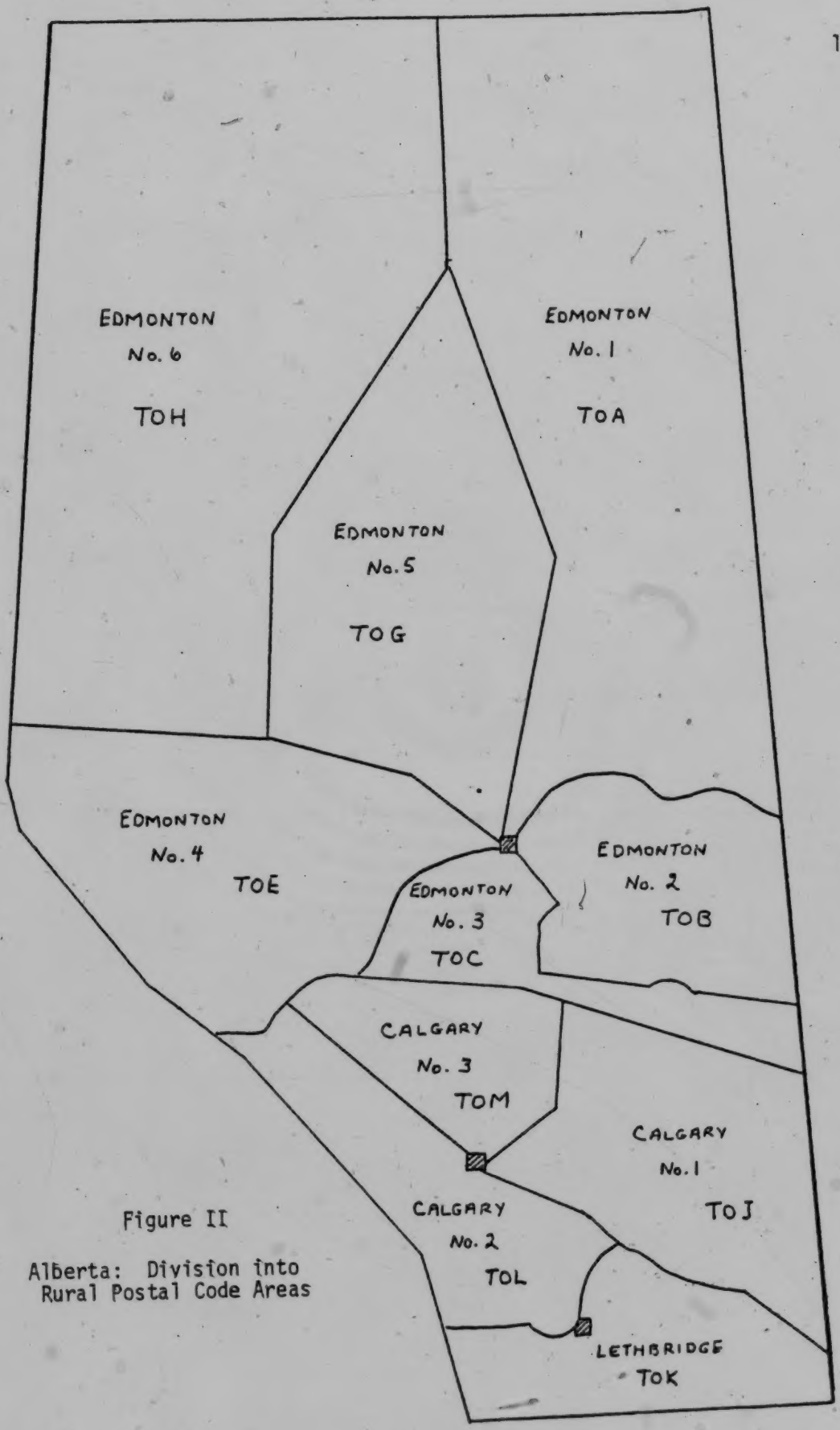


Figure II

Alberta: Division into
Rural Postal Code Areas

Figure III

Edmonton Postal Code Areas

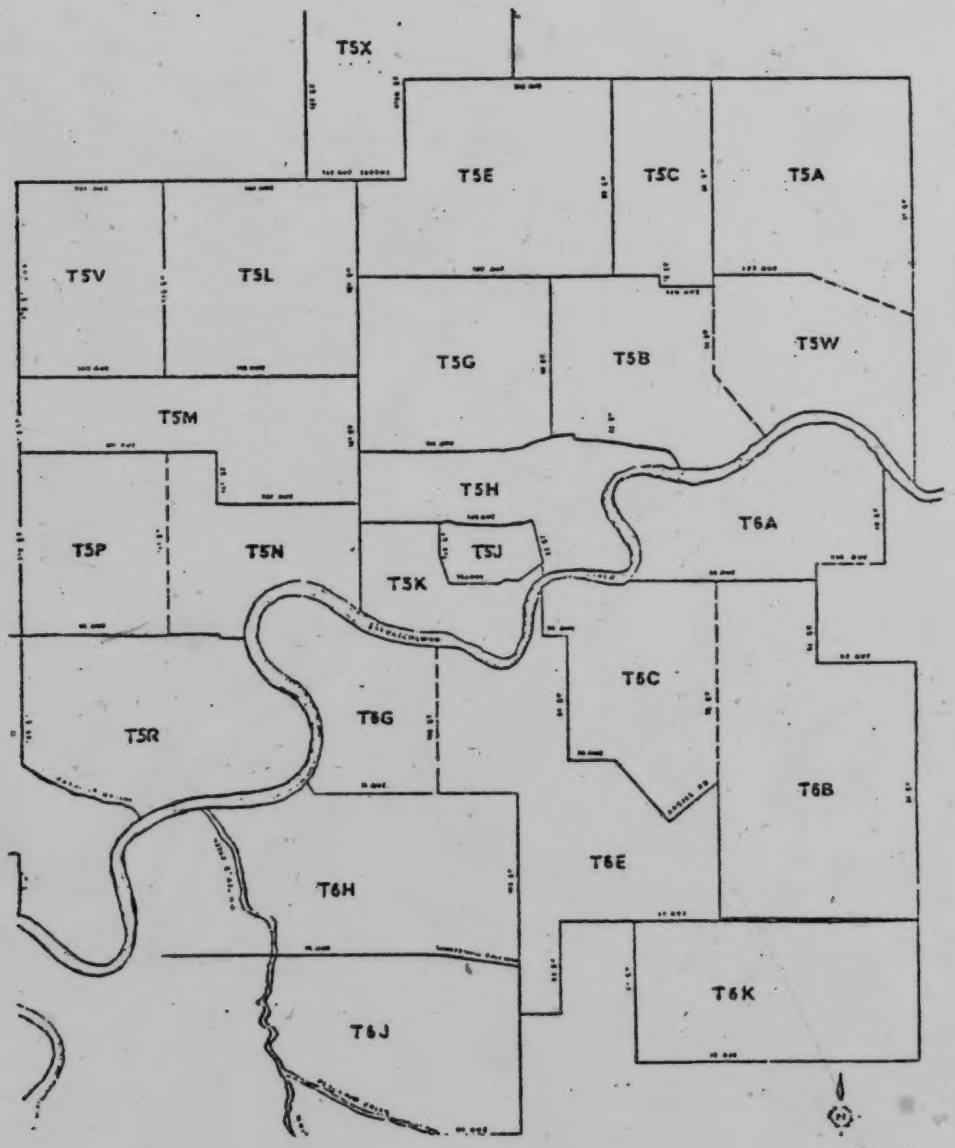
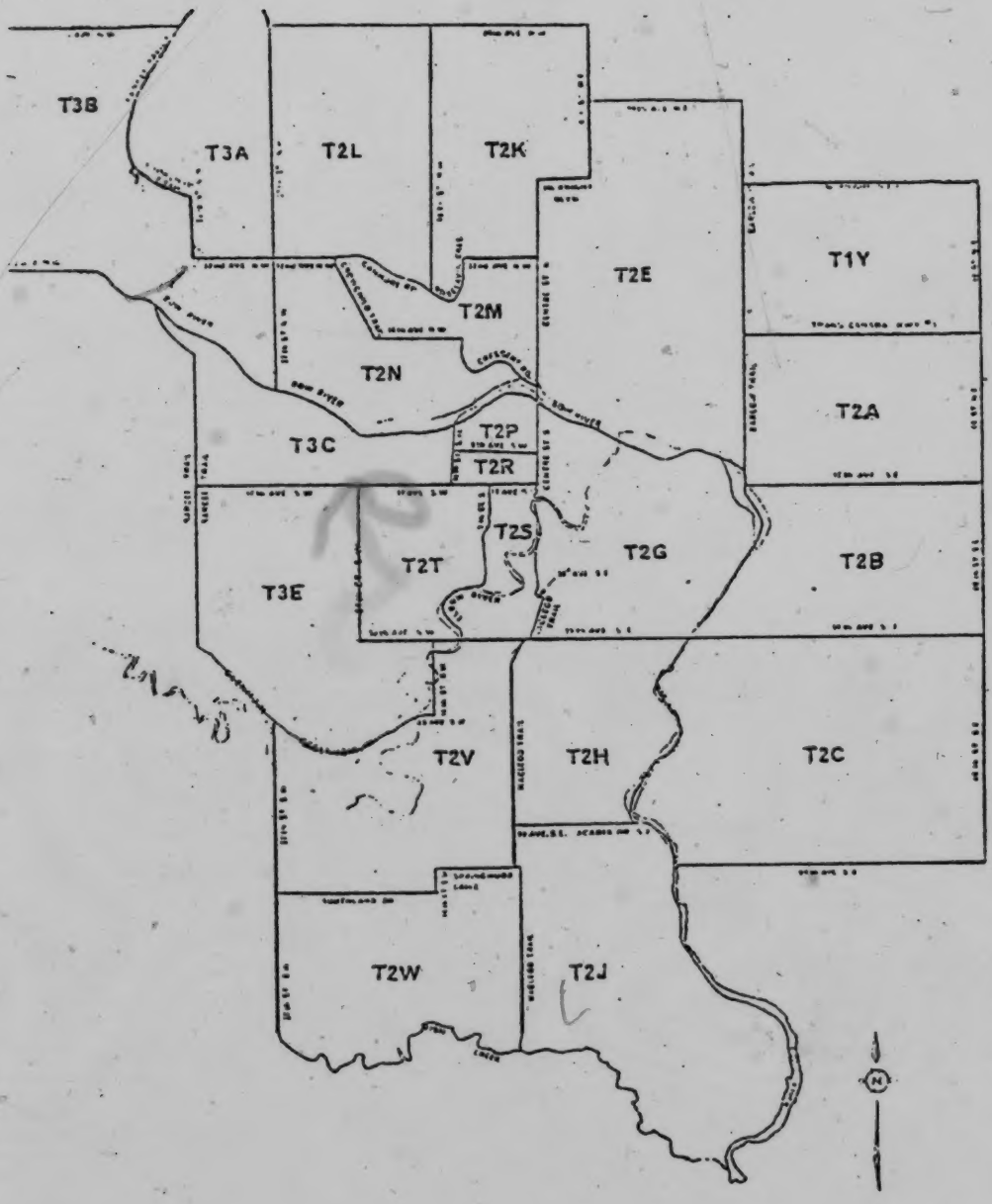


Figure IV

Calgary: Postal Code Areas



used, the point (home address) of patient origin may be determined. However, as with the geocode, the detail in the information provided likely limits this use to single-institution studies; larger studies would present excessive data manipulation and interpretation demands. If the code is limited to the first three characters, patient origin can be determined according to larger urban and rural areas. Unfortunately, the rural areas are very large--so large that they may obscure much patient origin-to-care location travel--and they are not aligned with either census areas or health care districts. As a result, population data will be more difficult to obtain and health care utilization more difficult to interpret. Urban areas are smaller and may possess some utility in studying patient travel to urban care facilities. For these reasons, postal codes have limited applications in patient origin-destination studies.

Aside from this focus on patient origin studies, it deserves mention that postal codes may find another use in health care research. Due to their universal use and the detail with which a person's address may be determined, postal codes may be used as the basis for randomly selecting patients from various areas of the province in health care surveys.

Census Boundaries

Census areas are important in health care research and planning activities since demographic information on the province's residents is collected and tabulated according to these areas. As delineated by Statistics Canada, there are three major levels of aggregation by which census data are available: 1) enumeration areas, 2) census subdivisions, and 3) census divisions. (A complete Canada-wide census is

conducted every five years, with the most detailed census being taken in the first year of each decade, followed by a less-detailed census in the sixth year).

Enumeration areas are the smallest geographic units for which census data are available. They represent spatial units which can be canvassed by one Census Representative and are defined according to the following criteria: 1) population size (they include as many as 375 households, depending on their location); 2) number of farms (they always include fewer than 100 farms); and 3) limits (as the building-blocks of all geo-statistical areas, enumeration areas never cut across any area recognized by the census, hence they respect census subdivision boundaries). Since these areas are based on population size, they may change from one census to the next. They may also change if census subdivision boundaries change. However, because of their small size, they provide flexibility in obtaining census data for geographic areas of any size or shape. Census files are organized using enumeration areas as the basic unit, hence tabulation of census data for any geographic area is accomplished by aggregating the appropriate enumeration areas.

Enumeration areas are amalgamated by Statistics Canada into census subdivisions. These areas are coterminous with provincial boundaries for municipalities, Indian Reserves, and unorganized territories and subdivisions (see Figure V). As a result, there are 83 subdivisions in Alberta. Since these areas follow municipal boundaries, they change only when municipalities are altered (Statistics Canada is informed of all boundary changes by the provincial government). The facts that census subdivisions are aligned with recognized areas of local government and that they are still relatively small in size make these areas

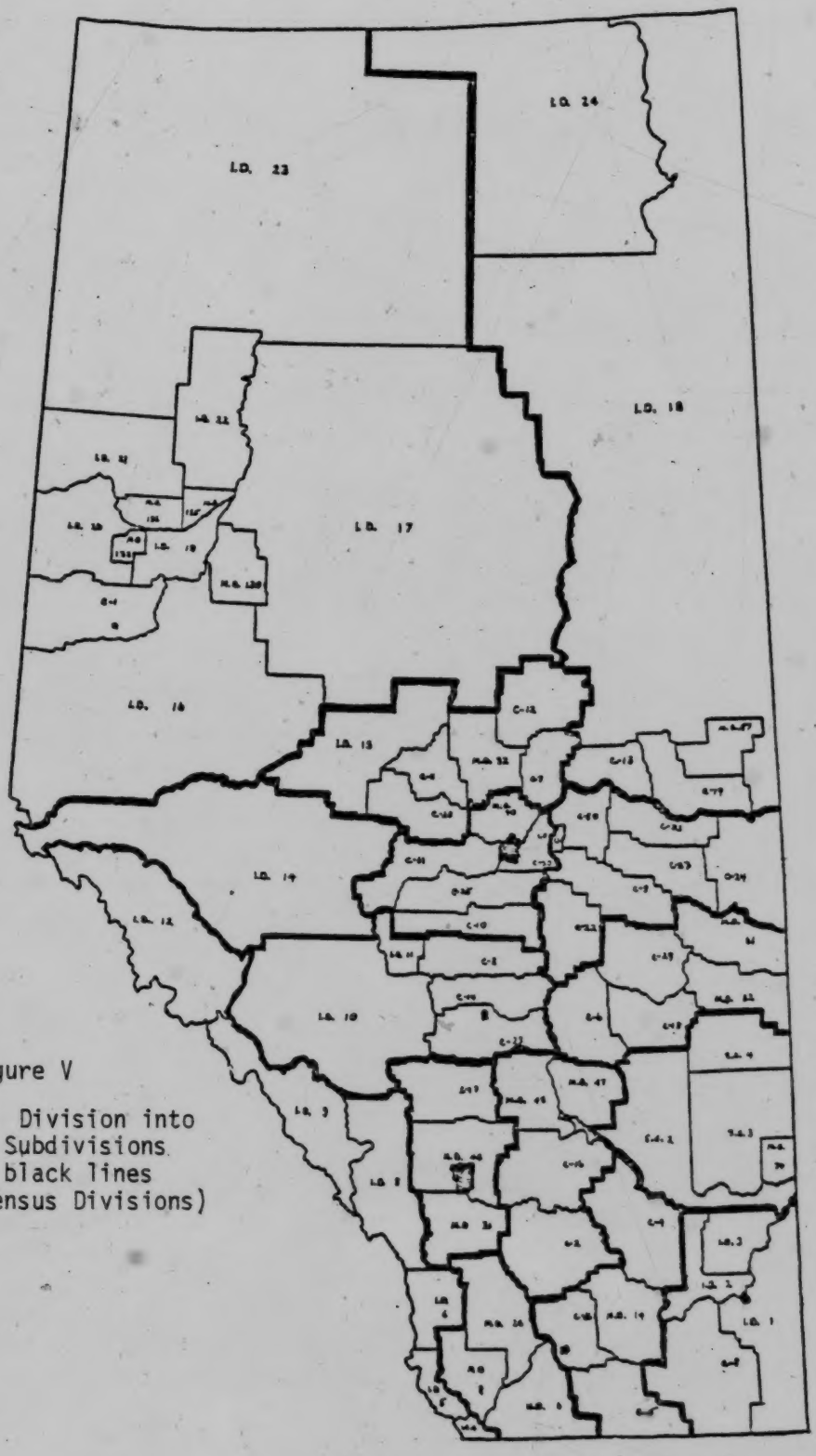


Figure V

Alberta: Division into Census Subdivisions (heavy black lines outline Census Divisions)

common choices for small area analyses of population characteristics. Although census subdivisions are the universal second level of aggregation for census areas, in the large urban centres of Edmonton and Calgary, enumeration areas are also combined into a number of census tracts. This permits a more detailed analysis of population data within each of these cities (each individual municipalities). Although census tract boundaries may change according to population distribution, tracts from a recent census may always be combined to yield the census tracts from the previous census, thereby allowing comparison of the same geographic area from census to census.

Census subdivisions are amalgamated into 15 census divisions for the province of Alberta (see Figure V). These are geostatistical areas that have been created by Statistics Canada in cooperation with the province, and they serve mainly as information-reporting units. Due to their large size, the utility of these divisions in patient origin studies and other health care planning and research activities will likely be limited to regional comparisons of population characteristics where the finer divisions provided by census subdivisions are not required.

In summary, these census areas allow health researchers or planners to obtain census data for specific geographic areas of their choice (by amalgamating appropriate enumeration areas), provincial municipalities (by referring to the appropriate census subdivisions), or groups of municipalities (by selecting the desired census divisions).

Municipalities

A municipality refers to a city, town, village, summer village,

or municipal district which has been incorporated as a municipality under The Municipal Government Act of the province of Alberta. These areas, illustrated in Figure VI, are termed municipal districts, counties, special areas, or improvement districts depending on their method of organization and administration. Presently in Alberta, there are 83 municipalities which serve as the basis for local government activities (e.g., as a decision-making, taxation, and accountability base for provision of public schools, water, sewage, sanitation, roads, and all other municipal services). Municipal boundaries tend to be relatively stable; any changes are made according to the Municipal Government Act and must be approved by government.

Since municipalities are coterminous with census subdivisions, they readily satisfy the requirement regarding availability of population data for patient origin studies in which the intent is to define service areas and corresponding service populations or to examine relationships between patient origin-destination patterns, rates of health care utilization, and demographic characteristics of area populations. The areas are also of sufficient size and number that patient flow patterns may be considered on a provincial basis without creating problems in data analysis and interpretation, yet small enough to provide reasonable detail in relation to patient movement. However, these advantages must be weighed against the fact that municipalities bear little relationship to those areas with authority for providing institutional health care in the province. For studies involving health care delivery, it would seem preferable (if possible) to use the appropriate health care districts to facilitate application of study findings.

Figure VI

Alberta: Division into Municipalities

Health Units

Health units refer to the districts constituted under The Health Unit Act of Alberta. There are presently 29 health units in the province (see Figure VII) which function as the administrative and service bases for the provision of public health services. Health unit boundaries are fairly stable, and any changes must be made according to the Health Unit Act and approved by government.

In terms of their utility in health services planning and research, health units would seem to be most appropriate as areas of analysis in studies related to public health. Although some health units are coterminous with municipal boundaries (and therefore, also with census subdivisions), others are not (census data for these health units must be collected by aggregating enumeration areas). Health units bear little relationship to general hospital, auxiliary hospital, or nursing home districts so they have limited applicability as areas of analysis in studies involving these latter health care services. Finally, the larger size of these areas may obscure relevant information regarding patient origin-to-care location travel. However, this is not to overlook the alternative situation in which these large areas (often including two, three, or more municipalities) may be well-suited to regional analyses of demographic and utilization characteristics pertaining to the provision of public health services.

General Hospital, Auxiliary Hospital, and Nursing Home Districts

Even though general hospital, auxiliary hospital, and nursing home districts may differ in geographic area and responsibility for services, they are discussed together since their organization and

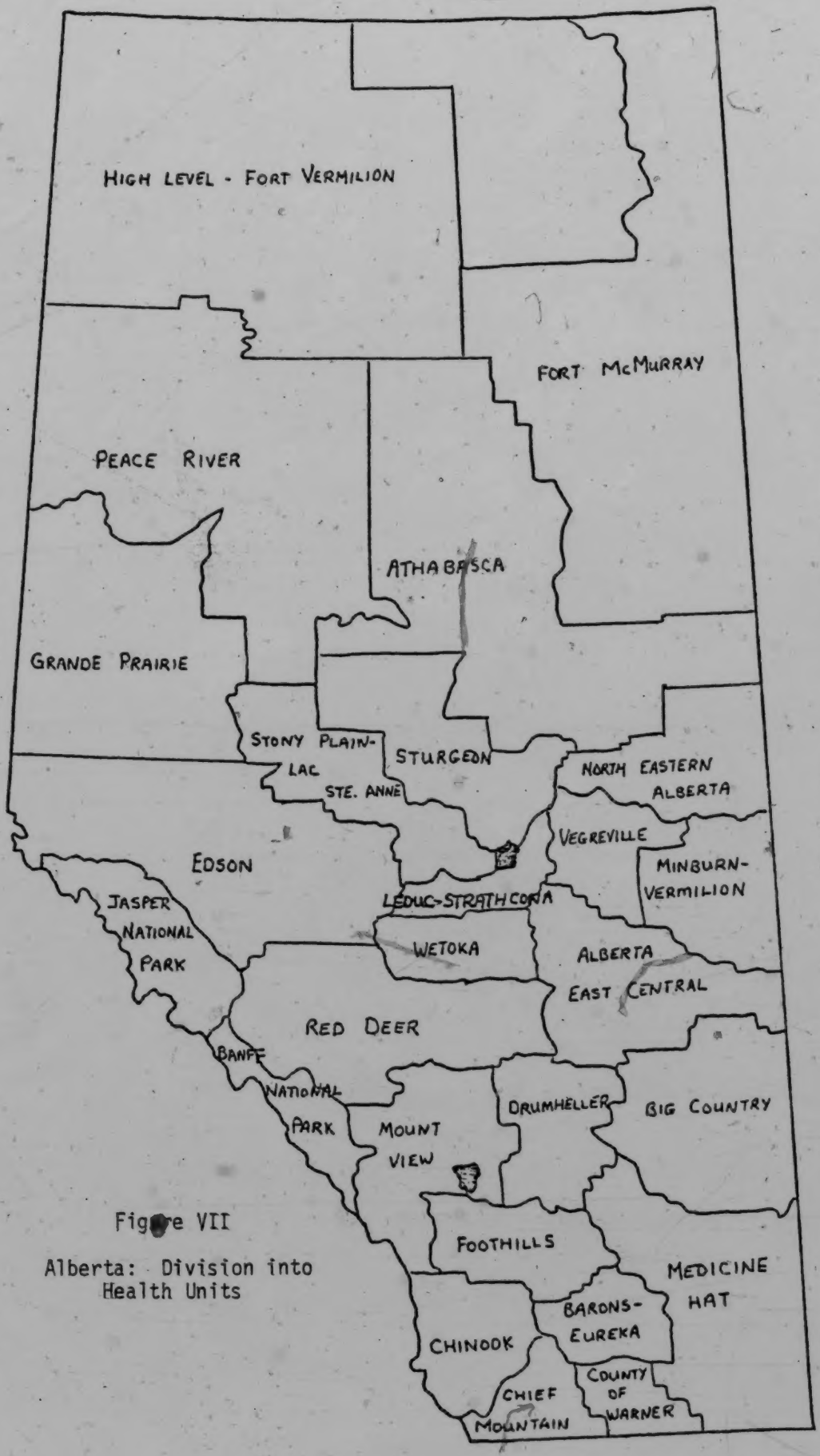


Figure VII

Alberta: Division into Health Units

constitution have often overlapped.

Municipal hospital districts were the first hospital districts established in Alberta (the first one being in 1918). They were the result of voluntary action of groups (or parts) of municipalities joining together to construct a hospital and establish a hospitalization plan to serve the residents of the district. The districts were usually small in recognition of the limited distances which could be travelled to the hospital. By 1960, there were 80 municipal hospital districts in the province.

In the meantime (i.e., in 1959), the province was divided into 32 potential auxiliary hospital districts as the initial step in establishing the province's Auxiliary Hospital Program. The boundaries of these districts were required to be coterminous with those of their included municipalities, with the districts being established on the basis of a minimum population of between 15 and 20 thousand in order to meet the initial estimated need of three auxiliary hospital beds per 1000 population. By 1964, 18 of the 32 districts had been formerly incorporated as auxiliary hospital districts under the Auxiliary Hospitals Act or under The Alberta Hospitals Act which replaced the former Act.

With the passing of the Nursing Homes Act in 1964, the boards of the incorporated auxiliary hospital districts were given the option to apply for the additional power to provide for nursing home care; these districts then became known formally as auxiliary hospital and nursing home districts. All the remaining potential auxiliary hospital districts applied only for the power to provide nursing home facilities; these districts were incorporated formally under The Nursing Homes Act

as nursing home districts.

By 1972, there were still a number of areas in the province which were not included in any hospital district. This prompted the government to direct that all unassigned areas be allocated to a general hospital district.

A major revision of The Alberta Hospitals Act in 1970 cancelled the previous restriction of coterminous boundaries for auxiliary hospital and nursing home districts and permitted amalgamation of general hospital districts with auxiliary hospital and nursing home districts. As a result of this legislation and the above historical developments, there are presently five sets of terminology for these health care areas, with the functions and powers vested in a district board being reflected in their names:

1) General Hospital District
   - provides general hospital services only.
2) Nursing Home District
   - provides or could provide nursing home services only.
3) Auxiliary Hospital and Nursing Home District
   - provides or could provide both auxiliary hospital and nursing home services.
4) General Hospital and Nursing Home District
   - provides general hospital services and provides, or could provide, nursing home services.
5) General and Auxiliary Hospital and Nursing Home District
   - provides general hospital services and provides, or could provide, auxiliary hospital and nursing home services.

The districts which resulted from the Nursing Home Plan (Auxiliary Hospital and Nursing Home Districts and Nursing Home Districts) are illustrated in Figure VIII. Hospital districts are illustrated in Figure IX; when considering this map, it is important to note that if a district also has authority for auxiliary hospital and nursing home care, the geographic territory for this may be different from that which is illustrated for general hospital purposes. Changes in district

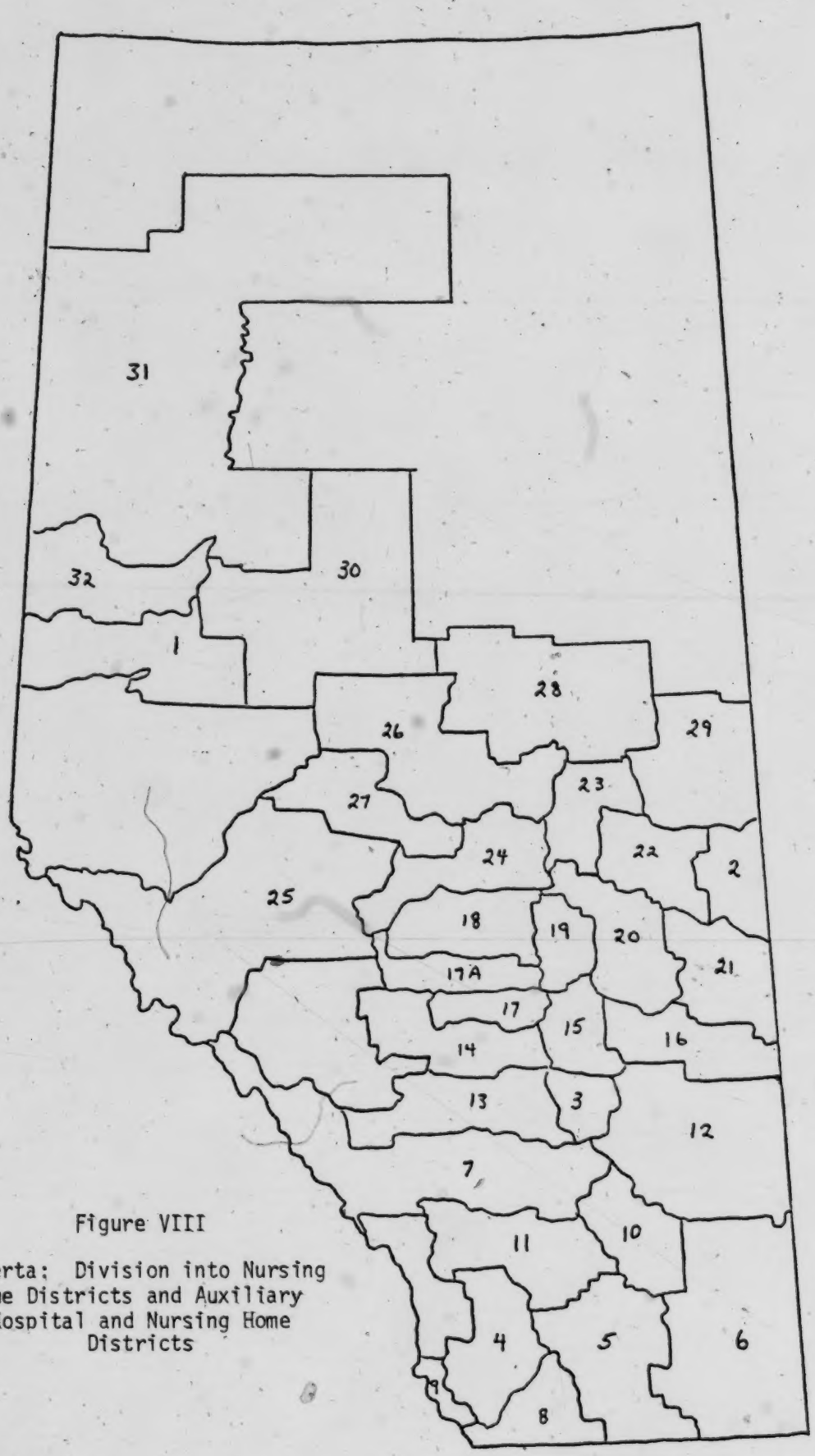


Figure VIII

Alberta: Division into Nursing Home Districts and Auxiliary Hospital and Nursing Home Districts

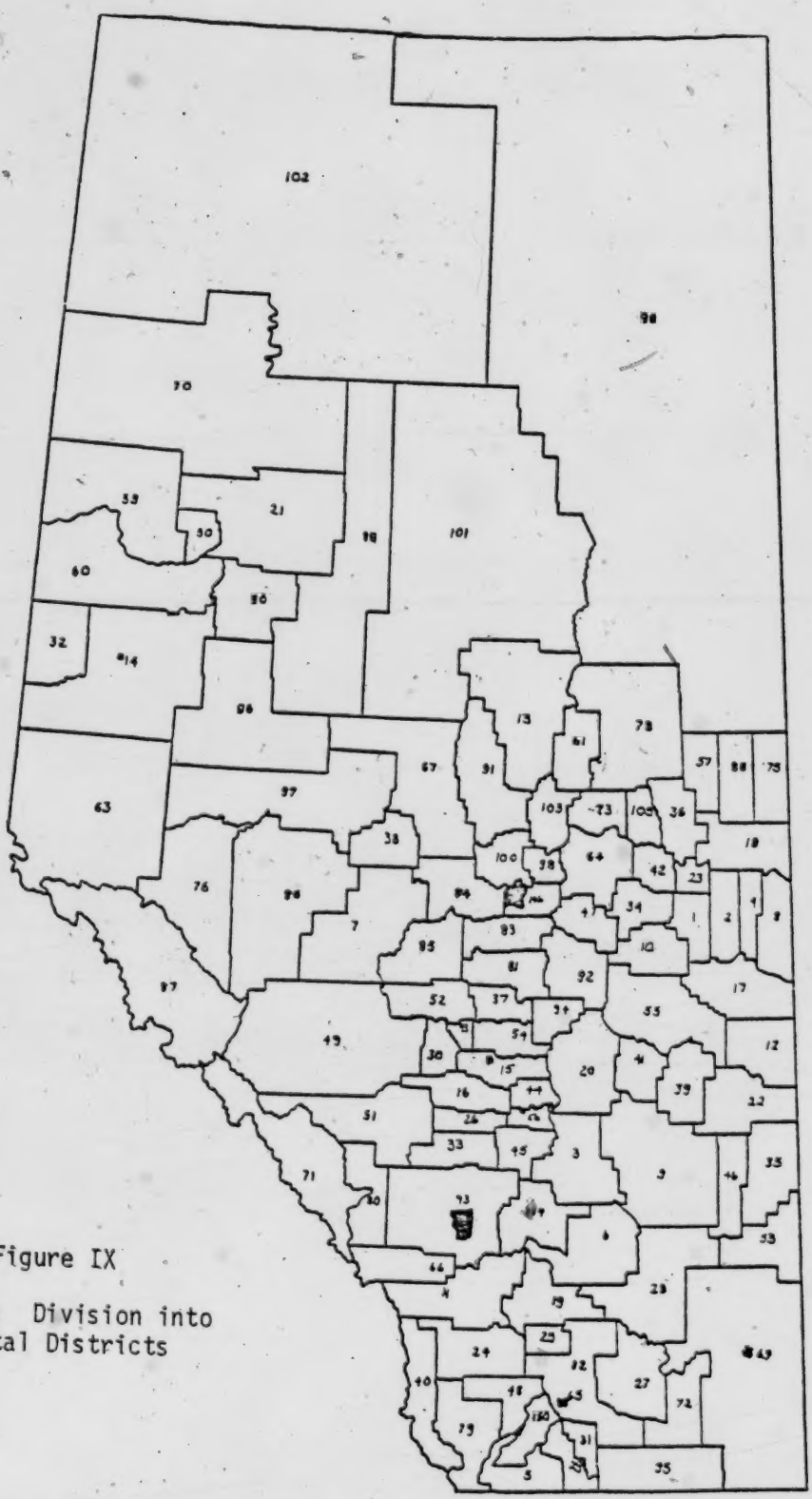


Figure IX

Alberta: Division into Hospital Districts

boundaries are governed by The Hospitals Act or The Nursing Homes Act (whichever is appropriate for the district being considered) and must be approved by government.

Considering the applicability of these various areas in patient origin studies, nursing home districts and nursing home and auxiliary hospital districts have limited utility since they do not encompass all areas of the province. Hospital districts, on the other hand, divide the province into 103 mutually exclusive and exhaustive areas. Unfortunately, hospital boundaries bear no relationship to census subdivisions; therefore, census data must be obtained by aggregating appropriate enumeration areas. Although hospital districts differ considerably in size, they are small enough to provide sufficient detail with regard to patient travel, yet large enough to permit analysis of origin-destination patterns on a province-wide basis without creating data-management problems. For these reasons, hospital districts would seem to be the most useful areas for patient origin in provincial analyses of utilization patterns involving general hospital, auxiliary hospital, or nursing home patients, in spite of the facts that not all hospital districts have authority for these latter types of care and that this authority, if present, may extend beyond the original hospital district boundaries.

Summary

As described, the province of Alberta may be divided up (or areas of patient origin located) on the basis of various point locations or geographic areas. Geographic coordinates and postal codes permit identification of home communities of patient origin and are likely to be

of most benefit in single-institution studies of patient travel patterns due to the detail provided. Municipalities and the various health care districts provide geographic areas of patient origin which may be used not only as the basis for examining patient origin-to-care location flow patterns, but also for determining service areas and service populations and analyzing differences in utilization and demographic characteristics of area residents. Census data may be obtained according to three areas, with enumeration areas providing the building blocks for obtaining population data for any geographic area, census subdivisions (coterminous with municipalities) providing a useful basis for small area comparisons of demographic factors, and census divisions providing larger divisions appropriate for regional studies of population characteristics.

With regard to the patient origin-destination study being undertaken in this thesis, hospital districts are deemed to be the most suitable areas of patient origin for the following three reasons:

1) Institutional health care administration is conducted generally in relation to hospital districts (although, as described, inconsistencies exist in regard to nursing home care). Use of this basic health care district permits comparison of utilization patterns for various types of care (e.g., acute, auxiliary, and nursing home care) and thereby facilitates regional planning from a system's perspective.

2) These areas are small enough to avoid sacrificing much information regarding patient flow patterns, yet large enough and of a reasonable number to permit a workable analysis.

3) Hospital districts divide the province into mutually exclusive and exhaustive areas so that all areas and all persons may be included in the study.

One limitation in using hospital districts as areas of patient origin is that they vary greatly in size and shape, hence distances travelled to nursing homes may vary greatly even though patients remain in their

area of residence to receive care. To circumvent this problem and allow a proper measure of distance to be made, patient origin would have to be indicated by a point location (e.g., as provided by the geocode). However, for reasons already provided, incorporation of this detail in a province-wide study is not really feasible. Therefore, in spite of the limitations inherent in using hospital districts as areas of patient origin, this approach remains the best alternative for the purposes of this study.

Footnotes

1. The following sources of information provided the basis for this paper:

   - Interview, July 4, 1979, with personnel at the Western Postal Region (Alberta District), Edmonton.
   - Interview, July 4, 1979, with personnel at the Alberta Bureau of Statistics.
   - Population: Geographic Distribution (Catalogue 92-806), Ottawa: Statistics Canada, October 1977.
   - The Municipal Government Act, Chapter 246 of the Revised Statutes of Alberta 1970, Edmonton: Queen's Printer, 1970.
   - The Health Unit Act, Chapter 168 of the Revised Statutes of Alberta 1970, Edmonton: Queen's Printer, 1970.
   - "The Evolution of Hospital Districts in Alberta", a paper received from Mr. L. Protti, Alberta Department of Hospitals and Medical Care.
   - "Historical Development of Alberta's Nursing Home Plan", Chapter 1 of Review of Alberta's Nursing Home Plan, 1976, a document received from Mr. L. Protti, Alberta Department of Hospitals and Medical Care.
   - The Hospitals Act, Chapter 194 of the Revised Statutes of Alberta 1970, Edmonton: Queen's Printer, 1970.
   - The Nursing Homes Act, Chapter 264 of the Revised Statutes of Alberta 1970, Edmonton: Queen's Printer, 1970.

APPENDIX B: SUPPLEMENTARY RESULTS

B.1 Demographic Characteristics of the NHA's

B.2 Unadjusted and Adjusted NHA Populations

B.3 Per Capita Nursing Home Bed Supply by NHA

B.4 Per Capita Rates of Institutionalization by NHA

B.5 Alberta: Division into High-Use and Low-Use Areas

B.6 Previous Location of Nursing Home Patients by Age Group and by High and Low-Use Areas

B.1 Demographic Characteristics of the NHA's
(1976 Census Results)

Nursing Home Area	Total Population (A)	#of Persons 65 yrs or more (B)	% of elderly (B/Ax100)	Male/Fem. Ratio[a] Overall	Male/Fem. Ratio[a] 65+
1. Peace River	25,160	1,515	6.02	109	119
2. Fairview	7,040	625	8.88	109	131
3. McLennan	5,785	465	8.04	114	116
4. Grande Prairie	44,020	1,575	6.70	108	112
5. High Prairie	15,060	840	5.58	106	110
6. Athabasca	34,080	1,840	5.40	110	130
7. Westlock	17,010	1,995	11.73	112	123
8. Barrhead	12,170	1,130	9.29	107	119
9. Mayerthorpe	36,020	1,850	5.05	111	128
10. Stony Plain	28,930	1,695	5.86	109	108
11. St. Albert	38,190	1,225	3.21	109	120
12. Ft. Saskatchewan	14,255	660	4.63	108	102
13. Edmonton	504,225	33,990	6.74	100	79
14. Smoky Lake	6,895	815	11.82	109	124
15. St. Paul	14,070	1,345	9.56	108	115
16. Bonnyville	17,890	970	5.42	109	125
17. Lamont	8,450	1,225	14.50	109	110
18. Two Hills	3,865	585	15.14	108	120
19. Vegreville	7,170	1,130	15.76	100	102
20. Vermilion	10,225	1,100	10.76	109	110
21. Lloydminster	9,935	1,000	10.07	105	96
22. Camrose	20,690	2,710	13.10	104	96
23. Viking	27,135	3,115	11.48	109	109
24. Provost	3,745	430	11.48	104	76
25. Stettler	9,575	1,080	11.28	105	117
26. Coronation	7,970	715	8.97	109	122
27. Leduc	36,600	2,640	7.21	110	126
28. Wetaskiwin	16,695	1,725	10.30	106	99
29. Ponoka	12,780	1,605	12.56	104	102
30. Lacombe	12,995	1,370	10.54	101	104
31. Red Deer	66,660	5,370	8.06	103	105
32. Didsbury	17,825	1,940	10.88	107	110
33. Three Hills	7,510	720	9.59	99	89
34. Drumheller	11,195	1,385	12.37	113	110
35. Hanna	8,960	945	10.55	112	106
36. Calgary	512,945	33,145	6.46	100	77
37. Brooks	17,175	1,090	6.35	110	121
38. High River	18,085	2,215	12.20	105	99
39. Vulcan	5,235	585	11.17	108	104
40. Crowsnest	7,300	815	11.16	104	104
41. Ft. Macleod	16,775	1,195	7.12	106	106
42. Cardston	8,775	1,005	11.45	101	100
43. Lethbridge	83,585	8,530	10.21	102	90
44. Medicine Hat	47,395	4,520	9.54	103	88
Provincial Total	1,838,050	137,870	7.50	103	91

[a]Sex Ratio = Number of males per 100 females

B.2 Unadjusted and Adjusted NHA Populations

Nursing Home Area	Unadjusted Population	Age-Adjusted Population	Age-Adj. Pop. / Unadj. Pop.	Age-Sex Adjusted Population	Age-Sex Adj. Pop. / Unadj. Pop.
1. Peace River	25,160	19,231	0.76	18,463	0.73
2. Fairview	7,040	7,622	1.08	7,993	1.14
3. McLennan	5,785	5,701	0.99	5,027	0.87
4. Grande Prairie	44,020	37,941	0.86	38,216	0.87
5. High Prairie	15,060	11,390	0.76	10,580	0.70
6. Athabasca	34,080	21,458	0.63	22,528	0.66
7. Westlock	17,010	25,121	1.48	23,142	1.36
8. Barrhead	12,170	13,575	1.12	12,441	1.02
9. Mayerthorpe	36,020	23,755	0.66	22,137	0.61
10. Stony Plain	28,930	20,318	0.70	19,346	0.67
11. St. Albert	38,190	18,583	0.49	19,187	0.50
12. Ft. Saskatchewan	14,255	8,478	0.59	7,440	0.52
13. Edmonton	504,225	458,241	0.91	464,368	0.92
14. Smoky Lake	6,895	10,401	1.51	10,235	1.48
15. St. Paul	14,070	17,396	1.24	16,483	1.17
16. Bonnyville	17,890	13,006	0.74	10,528	0.59
17. Lamont	8,450	15,373	1.82	14,724	1.74
18. Two Hills	3,865	7,489	1.94	7,232	1.87
19. Vegreville	7,170	13,867	1.93	13,221	1.84
20. Vermilion	10,225	16,307	1.59	16,820	1.64
21. Lloydminster	9,935	15,159	1.53	14,569	1.47
22. Camrose	20,690	37,215	1.80	38,023	1.84
23. Viking	27,135	42,085	1.55	41,119	1.52
24. Provost	3,745	6,389	1.71	6,588	1.76
25. Stettler	9,575	15,018	1.57	15,549	1.62
26. Coronation	7,970	10,484	1.32	11,510	1.44

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Nursing Home Area	Unadjusted Population	Age-Adjusted Population	Age-Adj. Pop. / Unadj. Pop.	Age-Sex Adjusted Population	Age-Sex Adj. Pop. / Unadj. Pop.
27. Leduc	36,600	33,289	0.91	31,718	0.87
28. Wetaskiwin	16,695	20,808	1.25	20,160	1.21
29. Ponoka	12,780	21,036	1.65	21,342	1.67
30. Lacombe	12,995	18,139	1.40	19,085	1.47
31. Red Deer	66,660	70,373	1.06	69,043	1.04
32. Didsbury	17,825	24,056	1.35	23,503	1.32
33. Three Hills	7,510	10,171	1.35	9,687	1.29
34. Drumheller	11,915	17,721	1.49	18,054	1.52
35. Hanna	8,960	13,948	1.56	12,903	1.44
36. Calgary	512,945	458,265	0.89	464,066	0.90
37. Brooks	17,175	14,124	0.82	13,544	0.79
38. High River	18,085	27,290	1.51	27,164	1.50
39. Vulcan	5,235	8,257	1.58	8,046	1.54
40. Crowsnest	7,300	9,690	1.33	9,694	1.33
41. Ft. Macleod	16,775	16,329	0.97	17,018	1.01
42. Cardston	8,775	13,661	1.56	14,046	1.60
43. Lethbridge	83,585	107,289	1.28	108,384	1.30
44. Medicine Hat	47,395	58,999	1.24	60,613	1.28
Provincial Total	1,838,050	1,835,048[a]		1,835,539[a]	

[a]Totals of adjusted NHA populations do not equal the original total provincial population (as they should) due to rounding off of fractional weights.

B.3 Per Capita Nursing Home Bed Supply by NHA

NHA	Number of Nursing Home Beds[a]	Bed Supply[b] Per 1000 Persons (Census Pop.)	Per 1000 Persons 65 yrs. or more	Per 1000 Persons (Age-Adjusted)	Per 1000 Persons (Age-Sex Adj.)
1. Peace River	76	3.0	50.2	4.0	4.1
2. Fairview	40	5.7	64.0	5.3	5.0
3. McLennan	50	8.6	107.5	8.8	10.0
4. Grande Prairie	138	3.1	46.8	3.6	3.6
5. High Prairie	52	3.5	61.9	4.6	4.9
6. Athabasca	50	1.5	27.2	2.3	2.2
7. Westlock	52	3.1	26.1	2.1	2.3
8. Barrhead	52	4.3	46.0	3.8	4.2
9. Mayerthorpe	50	1.4	27.5	2.1	2.3
10. Stony Plain	90	3.1	53.1	4.4	4.7
11. St. Albert	162	4.2	132.2	8.7	8.4
12. Ft. Saskatchewan	70	4.9	106.1	8.3	9.4
13. Edmonton	1764	3.5	51.9	3.9	3.8
14. Smoky Lake	33	4.8	40.5	3.2	3.2
15. St. Paul	75	5.3	55.8	4.3	4.6
16. Bonnyville	50	2.8	51.5	3.8	4.8
17. Lamont	31	3.7	25.3	2.0	2.1
18. Two Hills	30	7.8	51.3	4.0	4.2
19. Vegreville	40	5.6	35.4	2.9	3.0
20. Vermilion	50	4.9	45.5	3.1	3.0
21. Lloydminster	75	7.6	75.0	5.0	5.2
22. Camrose	100	4.8	36.9	2.7	2.6
23. Viking	64	2.4	20.5	1.5	1.6
24. Provost	50	13.4	116.3	7.8	7.6

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NHA	Number of Nursing Home Beds[a]	Bed Supply[b]			
		Per 1000 Persons (Census Pop.)	Per 1000 Persons 65 yrs. or more	Per 1000 Persons (Age-Adjusted)	Per 1000 Persons (Age-Sex Adj.)
25. Stettler	50	5.2	46.3	3.3	3.2
26. Coronation	33	4.1	46.2	3.2	2.9
27. Leduc	79	2.2	29.9	2.4	2.5
28. Wetaskiwin	50	3.0	29.0	2.4	2.5
29. Ponoka	70	5.5	43.6	3.3	3.3
30. Lacombe	52	4.0	38.0	2.9	2.7
31. Red Deer	288	4.3	53.6	4.1	4.2
32. Didsbury	40	2.2	20.6	1.7	1.7
33. Three Hills	37	4.9	51.4	3.6	3.8
34. Drumheller	80	7.2	57.8	4.5	4.4
35. Hanna	50	5.6	116.3	3.6	3.9
36. Calgary	2098	4.1	63.3	4.6	4.5
37. Brooks	50	2.9	45.9	3.5	3.7
38. High River	34	1.9	15.3	1.3	1.3
39. Vulcan	36	6.9	61.5	4.4	4.5
40. Crowsnest	30	4.1	36.8	3.1	3.1
41. Ft. Macleod	50	3.0	41.8	3.1	2.9
42. Cardston	40	4.6	39.8	2.9	2.9
43. Lethbridge	309	3.7	36.2	2.9	2.9
44. Medicine Hat	230	4.9	50.9	3.9	3.8
Provincial Total	6951	3.8	50.4	3.8	3.8

[a]Total number of rated beds in the NHA.

[b]Calculated by dividing the number of nursing home beds by the appropriate NHA population (as listed in Appendix B.1 or B.2).

B.4 Per Capita Rates of Institutionalization by NHA

NHA	Number of Patients in Nursing Homes[a]	Rates of Institutionalization[b] Per 1000 Persons (Census Pop.)	Per 1000 Persons 65 yrs. or more	Per 1000 Persons (Age-Adjusted)	Per 1000 Persons (Age-Sex Adj.)
1. Peace River	71	2.8	46.7	3.7	3.9
2. Fairview	44	6.3	70.4	5.8	5.5
3. McLennan	50	8.6	107.5	8.8	10.0
4. Grande Prairie	137	3.1	46.8	3.6	3.6
5. High Prairie	45	3.0	53.6	4.0	4.3
6. Athabasca	79	2.3	42.9	3.7	3.5
7. Westlock	64	3.8	32.1	2.6	2.8
8. Barrhead	46	3.8	40.7	3.4	3.7
9. Mayerthorpe	64	1.8	35.2	2.7	2.9
10. Stony Plain	61	2.1	36.0	3.0	3.2
11. St. Albert	69	1.8	56.3	3.7	3.6
12. Ft. Saskatchewan	58	4.1	87.9	6.8	7.8
13. Edmonton	1713	3.4	50.4	3.7	3.7
14. Smoky Lake	40	5.8	49.1	3.9	3.9
15. St. Paul	62	4.4	46.1	3.6	3.8
16. Bonnyville	49	2.7	50.5	3.8	4.7
17. Lamont	50	5.9	40.8	3.3	3.4
18. Two Hills	30	7.8	51.3	4.0	4.2
19. Vegreville	35	4.9	31.0	2.5	2.7
20. Vermilion	59	5.8	53.6	3.6	3.5
21. Lloydminster	47	4.7	47.0	3.1	3.2
22. Camrose	124	6.0	45.8	3.3	3.3
23. Viking	78	2.9	25.0	1.9	1.9
24. Provost	34	9.1	79.1	5.3	5.2

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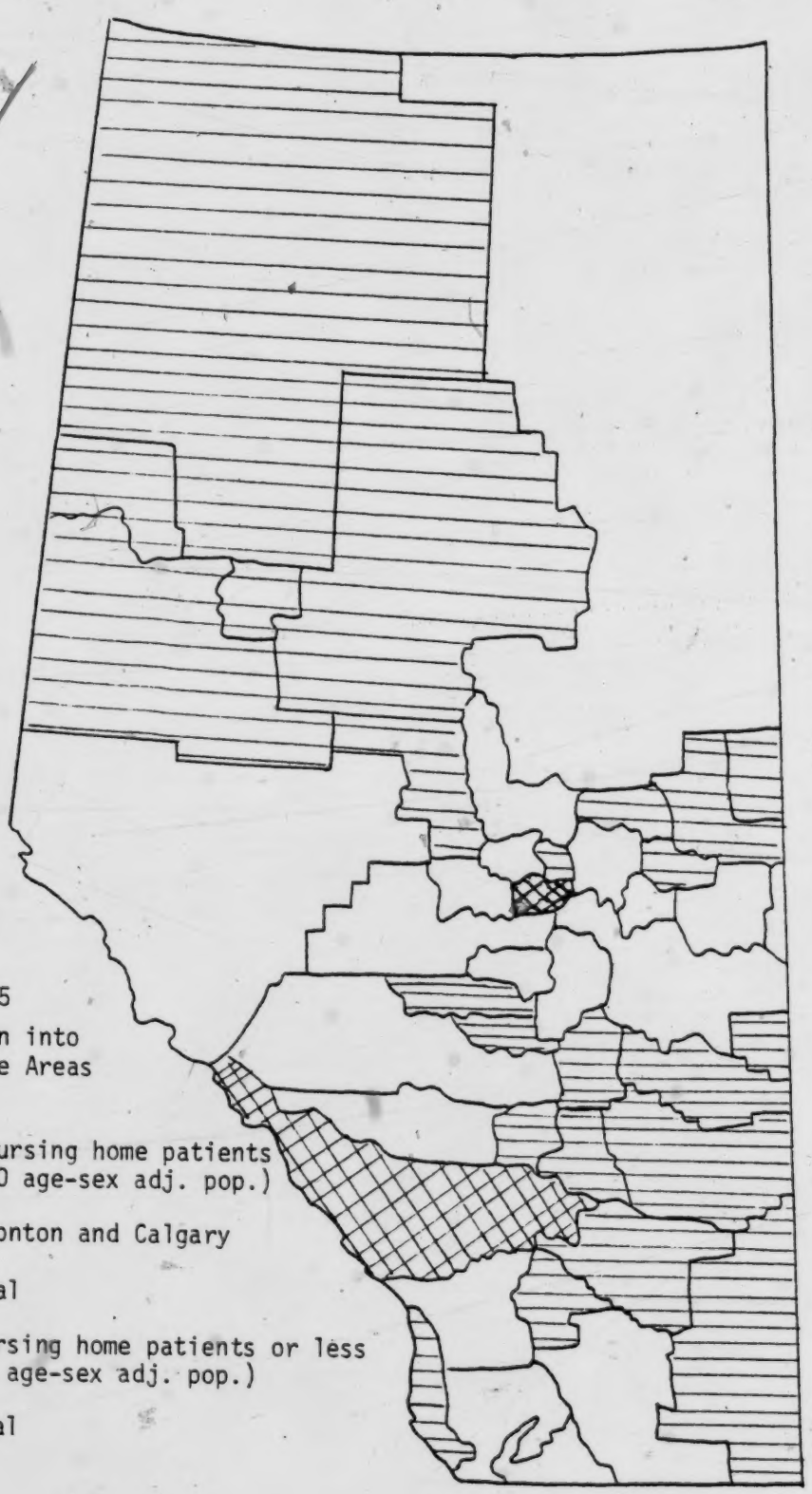
NHA	Number of Patients in Nursing Homes[a]	Rates of Institutionalization[b] Per 1000 Persons (Census Pop.)	Per 1000 Persons 65 yrs. or more	Per 1000 Persons (Age-Adjusted)	Per 1000 Persons (Age-Sex Adj.)
25. Stettler	59	6.6	54.6	3.9	3.8
26. Coronation	44	5.5	61.5	4.2	3.8
27. Leduc	95	2.6	36.0	2.9	3.0
28. Wetaskiwin	54	3.2	31.3	2.6	2.7
29. Ponoka	90	7.0	56.1	4.3	4.2
30. Lacombe	71	5.5	51.8	3.9	3.7
31. Red Deer	218	3.3	40.6	3.1	3.2
32. Didsbury	54	3.0	27.8	2.2	2.3
33. Three Hills	44	5.9	61.1	4.3	4.5
34. Drumheller	80	7.2	57.8	4.5	4.4
35. Hanna	59	6.6	62.4	4.2	4.6
36. Calgary	1876	3.7	56.6	4.1	4.0
37. Brooks	62	3.6	56.9	4.4	4.6
38. High River	82	4.5	37.0	3.0	3.0
39. Vulcan	30	5.7	51.3	3.6	3.7
40. Crowsnest	36	4.9	44.2	3.7	3.7
41. Ft. Macleod	24	1.4	20.1	1.5	1.4
42. Cardston	36	4.1	35.8	2.6	2.6
43. Lethbridge	328	3.9	38.5	3.1	3.0
44. Medicine Hat	237	5.0	52.4	4.0	3.9
Provincial Total	6682	3.6	48.5	3.6	3.6

[a]Total number of patients from a NHA who are in nursing homes.

[b]Calculated by dividing the number of nursing home patients originating from the NHA by the appropriate NHA population (as listed in Appendix B.1 or B.2).



Appendix B.5

Alberta: Division into
High-Use and Low-Use Areas

HIGH-USE (3.61 nursing home patients or more per 1000 age-sex adj. pop.)

Edmonton and Calgary

Rural

LOW-USE (3.60 nursing home patients or less per 1000 age-sex adj. pop.)

Rural

B.6 Previous Location of Nursing Home Patients by Age Group and by High and Low-Use Areas

Location Prior to Nursing Home Admission	Age Group (in yrs.)				Row Total
	less than 65	65-74	75-84	85 or more	
HIGH-USE AREAS -Edmonton & Calgary					
General Hospital	106 (10.6)[a]	200 (20.1)	417 (41.9)	273 (27.4)	996 (100.0)
Auxiliary Hospital	63 (19.1)	76 (23.0)	116 (35.2)	75 (22.7)	330 (100.0)
Mental Hospital	88 (42.3)	94 (45.2)	24 (11.5)	2 (1.0)	208 (100.0)
Nursing Home	30 (11.0)	44 (16.2)	110 (40.4)	88 (32.4)	272 (100.0)
Lodge	5 (2.7)	17 (9.3)	90 (49.5)	70 (38.5)	182 (100.0)
Private Home	163 (10.9)	221 (14.8)	681 (45.6)	427 (28.6)	1492 (100.0)
Other	16 (15.2)	18 (17.1)	38 (36.2)	33 (31.4)	105 (100.0)
Column Total	471 (13.1)	670 (18.7)	1476 (41.2)	968 (27.0)	3585 (100.0)

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Location Prior to Nursing Home Admission	Age Group (in yrs.)				Row Total
	less than 65	65-74	75-84	85 or more	
HIGH-USE AREAS - Rural					
General Hospital	45 (9.2)[a]	100 (20.4)	217 (44.2)	127 (26.3)	491 (100.0)
Auxiliary Hospital	38 (21.8)	34 (19.5)	65 (37.4)	37 (21.3)	174 (100.0)
Mental Hospital	49 (45.8)	46 (43.0)	10 (9.3)	2 (1.9)	107 (100.0)
Nursing Home	12 (20.3)	16 (27.1)	21 (35.6)	10 (16.9)	59 (100.0)
Lodge	4 (3.6)	14 (12.7)	43 (39.1)	49 (44.5)	110 (100.0)
Private Home	55 (11.4)	91 (18.8)	206 (42.6)	132 (27.3)	484 (100.0)
Other	7 (16.3)	10 (23.3)	12 (27.9)	14 (32.6)	43 (100.0)
Column Total	210 (14.3)	311 (21.2)	574 (39.1)	373 (25.4)	1468 (100.0)

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Location Prior to Nursing Home Admission	Age Group (in yrs.)				Row Total
	Less than 65	65-74	75-84	85 or more	
LOW-USE AREAS - Rural					
General Hospital	30 (5.9)[a]	103 (20.2)	209 (41.1)	167 (32.8)	509 (100.0)
Auxiliary Hospital	49 (18.3)	40 (14.9)	110 (41.0)	69 (25.7)	268 (100.0)
Mental Hospital	51 (50.5)	28 (27.7)	20 (19.8)	2 (2.0)	101 (100.0)
Nursing Home	10 (12.3)	15 (18.5)	29 (35.8)	27 (33.3)	81 (100.0)
Lodge	2 (1.3)	11 (7.2)	69 (45.4)	70 (46.1)	152 (100.0)
Private Home	50 (10.5)	100 (21.1)	204 (43.0)	120 (25.3)	474 (100.0)
Other	13 (37.1)	5 (14.3)	11 (31.4)	6 (17.1)	35 (100.0)
Column Total	205 (12.7)	302 (18.6)	652 (40.2)	461 (28.5)	1620 (100.0)

[a]Numbers in parentheses indicate percent of total patients from a certain location who are in a particular age group (i.e., percent of row total).